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## BULLETIN No. 289. JANUARY, 1913

# Meteorological Observations
AT THE
# MASSACHUSETTS
# AGRICULTURAL EXPERIMENT
# STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.
*Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.*
*Height of Wind Instruments 72 ft.*

## MONTHLY SUMMARY.

### **Pressure.** In inches.

| | |
|---|---|
| Maximum reduced to freezing, | 30 41, 13th, 11 A.; 14th, 10 A. |
| Minimum reduced to freezing, | 28.25, 3d, 6 P. |
| Reduced† maximum reading, | 30.73, 13th, 11 A.; 14th, 10 A. |
| Reduced† minimum reading, | 28.55, 3d, 6 P. |
| Mean semi-daily reduced, | 30.096 |
| Monthly range, | 2.18 |

### ***Air Temperature.** In Degrees Fahr.

| | |
|---|---|
| Highest, | 59.5, 3d, 2:30 P. |
| Lowest, | 11.0, 9th, 7:30 A. |
| Mean hourly, | 33.6 |
| Mean of means of max. and min., | 34.2 |
| Mean sensible (wet bulb), | 30.2 |
| Monthly range, | 48.5 |
| Highest mean daily, | 46.2, 18th |
| Lowest mean daily, | 16.8, 9th |
| Mean maximum, | 43.0 |
| Mean minimum, | 25.3 |
| Mean daily range, | 17.7 |
| Greatest daily range, | 35.5, 12th |
| Least daily range, | 7.0, 4th |

### **Humidity.**

| | |
|---|---|
| Mean dew point, | 25.9 |
| Mean force of vapor, | .192 |
| Mean relative humidity, | 79.0 |

### **Precipitation.** In inches.

| | |
|---|---|
| Total precipitation, | 3.98 |
| Number of days on which .01 inch or more rain fell, | 15 |
| Total snow in inches | 4.0 |

*Temperature in ground shelter.
Reduced to freezing and sea-level.

### **Wind.**

| | |
|---|---|
| Total movement, | 5359m. |
| Greatest daily movement, | 642m., 4th |
| Least daily movement, | 14m., 2d |
| Mean daily movement, | 172 m |
| Mean hourly velocity, | 7.2 m |

Maximum pressure per square foot, 18.0 lbs.= 60m. per hour, 3d, 3 P., S.W.
Maximum velocity for 5 minutes, 48 m. per hour, 3d, 3 P., S.W.
Prevailing Direction, Southwest.

Summary.

| | |
|---|---|
| West Northwest | 13 per cent |
| South | 10 " " |
| South Southwest | 13 " " |
| Southwest | 23 " " |
| South Southeast | 10 " " |
| Other directions | 31 " " |

### **Weather.**

| | |
|---|---|
| Mean cloudiness observed, | 63 per cent. |
| Total cloudiness recorded by the Sun Thermometer, | 115 hrs.=39 per cent. |
| Number of clear days, | 13 |
| Number of fair days, | 10 |
| Number of cloudy days, | 8 |

### **Bright Sunshine.**

Number of hours recorded, . . 179 hrs=61%.
**Rain,** 2d, 3d, 5th, 6th, 7th, 8th, 11th, 12th, 15th, 16th, 17th, 18th, 21st, 23d, 27th, 31st.
**Snow,** 4th, 7th, 23d, 29th.
**Hail,** 6th, 15th, 18th.
**Thunder and Lightning,** 18th, 31st.
**Days of Sleighing,** none.
**Gales,** 35 or more miles per hour: 60 m, 3d, S.W.; 54m., 4th, S.W.; 37m., 8th, W.N.W.; 49 m., 12th, W., 58 m., 18th, W.S.W.; 36 m., 21st, W.; 39 m.. 31st, S.S.W.

# DAILY SUMMARY.

| Day. | Barometer Reduced to Sea Level. | | | Temperature. Ground Shelter. | | | | | | | No. of Hours Bright Sunshine |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Maximun. | Minimum. | Mean. Semi-daily. | Maximum | Time. | Minimum. | Time. | Mean of Max. and Min. | Mean Hourly Draper. | Mean Sensible Wet Bulb. | |
| 1 | 30.28 | 29.85 | 30.070 | 45.5 | 3 P | 30.0 | 12 P | 37.7 | 38.0 | 31.7 | 8.2 |
| 2 | 30.31 | 29.78 | 30.128 | 43.5 | 3:30 P | 23.5 | 8:30 A | 33.5 | 31.9 | 28.3 | 8.3 |
| 3 | 29.78 | 28.55 | 28.920 | 59.5 | 2:30 P | 31.5 | 12 P | 45.5 | 38.5 | 36.5 | 3.3 |
| 4 | 29.95 | 28.68 | 29 468 | 39.0 | 5:30 A | 32.0 | 12 P | 35.5 | 35.1 | 29.3 | 6.5 |
| 5 | 30.59 | 29.95 | 30.448 | 36.5 | 3 P | 29.0 | 9 A | 32.7 | 32.0 | 27.7 | 7.8 |
| 6 | 30.56 | 30.19 | 30.375 | 49.0 | 12 P | 31.5 | 0 A | 40.3 | 37.1 | 35.3 | 3.6 |
| 7 | 30.22 | 30.05 | 30.192 | 51.0 | 3 A | 32.0 | 12 P | 41.5 | 39.5 | 36.5 | 0.0 |
| 8 | 30.29 | 29.64 | 29.902 | 35.5 | 3 P | 16.0 | 12 P | 25.7 | 29.5 | 24.7 | 0.0 |
| 9 | 30.71 | 30.29 | 30.668 | 26.5 | 3:30 P | 11.0 | 7:30 A | 18.7 | 16.8 | 12.0 | 8.5 |
| 10 | 30.55 | 30.22 | 30.366 | 36.5 | 2 P | 18.0 | 0 A | 27.3 | 29.0 | 26.3 | 8.3 |
| 11 | 30.22 | 29.79 | 30.011 | 43.0 | 12 P | 33.0 | 0 A | 38.0 | 38.3 | 37.7 | 4.8 |
| 12 | 30.41 | 29.48 | 29.902 | 55.0 | 11:30 A | 19.5 | 12 P | 37.3 | 39.0 | 35.7 | 0.0 |
| 13 | 30.73 | 30.41 | 30.707 | 23.0 | 4 P | 13.0 | 7:30 A | 18.0 | 17.8 | 14.5 | 7.8 |
| 14 | 30.73 | 30.63 | 30.711 | 35.0 | 4 P | 14.0 | 8 A | 24.5 | 23.1 | 17.5 | 8.5 |
| 15 | 30.65 | 30.33 | 30.479 | 41.0 | 3 P | 25.5 | 0 A | 33.3 | 33.5 | 31.3 | 6.2 |
| 16 | 30.33 | 30.27 | 30.299 | 45.5 | 3 P | 35.0 | 12 P | 40.3 | 39.3 | 37.0 | 5.5 |
| 17 | 30.31 | 29.95 | 30.052 | 50.0 | 3:30 P | 35.0 | 0 A | 42.5 | 43.1 | 42.5 | 1.5 |
| 18 | 29.95 | 29.55 | 29.776 | 51.0 | 6 P | 39.0 | 12 P | 45.0 | 46.2 | 43.0 | 4.0 |
| 19 | 30.33 | 29.71 | 30.237 | 41.5 | 2 P | 26.0 | 12 P | 33.7 | 34.3 | 28.7 | 8.7 |
| 20 | 30.36 | 29.74 | 30.181 | 48.0 | 12 P | 24.0 | 8 A | 36.0 | 35.2 | 32.7 | 8.0 |
| 21 | 30.28 | 29.61 | 30.094 | 54.5 | 4 A | 23.0 | 12 P | 38.7 | 37.1 | 29.7 | 6.7 |
| 22 | 30.44 | 30.28 | 30.373 | 38.5 | 3 P | 19.0 | 7 A | 28.7 | 27.5 | 23.7 | 8.8 |
| 23 | 30.43 | 29.79 | 30.120 | 45.0 | 10:30 P | 22.0 | 5 A | 33.5 | 30.9 | 32.5 | 0.0 |
| 24 | 30.02 | 29.79 | 29.965 | 42.5 | 0 A | 31.0 | 12 P | 36.7 | 37.7 | 33.3 | 7.0 |
| 25 | 29.97 | 29.86 | 29.911 | 43.0 | 3 P | 27.0 | 8 A | 35.0 | 33.0 | 27.3 | 8.8 |
| 26 | 29.95 | 29.58 | 29.805 | 50.0 | 3 P | 27.5 | 5 A | 38.7 | 38.5 | 33.7 | 8.0 |
| 27 | 29.69 | 29.42 | 29.518 | 43.0 | 0 A | 25.0 | 12 P | 34.0 | 35.7 | 32.3 | 1.5 |
| 28 | 30.15 | 29.69 | 30.000 | 32.0 | 2:30 P | 20.5 | 5 A | 26.3 | 25.3 | 21.7 | 7.2 |
| 29 | 30.38 | 30 15 | 30.326 | 30.0 | 2 P | 15.5 | 7:30 A | 22.7 | 23.0 | 19.7 | 7.0 |
| 30 | 30.20 | 30.11 | 30.161 | 43.0 | 3 P | 25.5 | 0 A | 34.3 | 33 2 | 30.5 | 8.0 |
| 31 | 30.13 | 29.48 | 29.819 | 56.0 | 3 P | 30.5 | 2 A | 43.3 | 43.8 | 44.0 | 6.7 |

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# DAILY SUMMARY.

| Day. | Humidity. | | | Wind. | | | | | Precipitation. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Mean Dew Point. | Mean Force vapor. | Mean Relative Humidity. | Prevailing Direction. | Total Movement in Miles. | Maximum Pressure Per Square Ft | Miles per Hour. | Time. | Beginning. | Ending. | Total in Inches. Rain.** | Total in Inches. Snow. |
| 1 | 28.0 | .194 | 80.5 | W.N.W. | 121 | 1.5 | 17 | 3 P | | | | |
| 2 | 26.0 | .164 | 86.5 | N.N.E. | 14 | 0.0 | — | — | 11 P | 12 P | T | |
| 3 | 32.5 | .234 | 81.5 | S. | 290 | 18.0 | 60 | 3 P | 0 A | 1:30 P | .55 | |
| 4 | 18.0 | .199 | 52.5 | S.W. | 642 | 14.5 | 54 | 3 P | 11 A | 1 P | T | T |
| 5 | 21.5 | .170 | 68.5 | W.N.W. | 196 | 1.5 | 17 | 4 A | 11 P | 12 P | .01 | |
| 6 | 31.0 | .233 | 76.5 | E.S.E. | 20 | 0.0 | — | — | 0 A | 1 A | .01 | |
| 7 | 34.5 | .228 | 88.5 | N.E. | 99 | 0.5 | 10 | 11 A | 9:30 A | 12 P | .59 | 1 |
| 8 | 12.0 | .153 | 60.5 | S.S.W. | 138 | 7.0 | 37 | 6 P | 0 A | 2 P | 1.02 | |
| 9 | 1.0 | .088 | 55.0 | W.S.W. | 188 | 1.5 | 17 | 4 A | | | | |
| 10 | 23.0 | .157 | 80.5 | S. | 205 | 0.5 | 10 | 8 A | | | | |
| 11 | 37.0 | .233 | 95.5 | S. | 141 | 0.0 | — | — | 3 A | 12 P | .20 | |
| 12 | 31.5 | .242 | 79.5 | S.W. | 372 | 12.0 | 49 | 5 P | 0 A | 3 P | .14 | |
| 13 | 9.0 | .094 | 72.0 | N.W. | 187 | 4.0 | 28 | 1 A | | | | |
| 14 | 10.5 | .113 | 67.5 | W. | 47 | 0.5 | 10 | 12 P | | | | |
| 15 | 29.0 | .191 | 84.0 | S.S.E. | 238 | 2.0 | 20 | 4 P | 8 P | 12 P | .01 | |
| 16 | 36.0 | .229 | 92.0 | S.W. | 111 | 1.0 | 14 | 0 A | 0 A | 2 A | T | |
| 17 | 42.0 | .275 | 98.0 | S.S.E. | 81 | 0.0 | — | — | 3 A | 8 P | .52 | |
| 18 | 39.5 | .300 | 83.5 | S.W. | 168 | 17.0 | 58 | 10 P | 3 P | 11 P | .11 | |
| 19 | 24.0 | .171 | 75.5 | W.N.W. | 313 | 5.0 | 32 | 0 A | | | | |
| 20 | 30.5 | .216 | 84.5 | S.S.W. | 76 | 1.5 | 17 | 8 P | | | | |
| 21 | 25.0 | .188 | 73.5 | W. | 394 | 6.5 | 36 | 5 A | 1 A | 6 A | .14 | |
| 22 | 20.0 | .137 | 84.0 | S.W. | 75 | 0 0 | — | — | | | | |
| 23 | 31.5 | .198 | 92.0 | S.S.E. | 47 | 1.5 | 17 | 8 P | 11 A | 9 P | .28 | 1 |
| 24 | 29.5 | .207 | 79.0 | S.W. | 116 | 0.0 | — | — | | | | |
| 25 | 24.5 | .159 | 84.5 | E. | 68 | 1.0 | 14 | 1 P | | | | |
| 26 | 28.5 | .224 | 73.5 | S.S.W. | 138 | 2.0 | 20 | 11 P | | | | |
| 27 | 27.5 | .203 | 78.0 | N.W. | 247 | 2.5 | 22 | 6 P | 8 A | 11 A | .02 | |
| 28 | 15.0 | .131 | 68.5 | W.N.W. | 212 | 2.0 | 20 | 1 P | | | | |
| 29 | 14.5 | .118 | 75.5 | E. | 61 | 0.0 | — | — | 2 P | 11 P | .18 | 2 |
| 30 | 28.0 | .179 | 85.0 | S.S.W. | 91 | 0.0 | — | — | | | | |
| 31 | 43.0 | .310 | 93.5 | S.W. | 263 | 7.5 | 39 | 10 P | 9:30 P | 11 P | .20 | |

**Rain or meltedsnow at base of tower. *Included in following day.

APR 1921

## REMARKS

The weather during January was most unseasonable in its temperature, and exceptional in its barometric pressure. Throughout the month the weather conditions resembled the normal conditions of March much more closely than those of January. The absence of snow on the ground, excepting for short periods, tended to increase the resemblance to early spring rather than midwinter weather.

A comparison of the records of the various weather elements with those of former years shows the following interesting features: The mean barometer was higher than the normal, and the range of pressure was the largest ever noted for a single month at this station. The minimum barometer, on the third, was the lowest recorded here since this station was established. The minimum for Feb., 1895, of 28.56 inches was, however, but one one-hundredth of an inch higher than this month's record.

The mean temperature for the month broke all records for January, at Amherst, back to 1836—as far back as our records extend. The average temperature was more than 10° higher than the normal and, taken in connection with the unusually high temperature of the preceding month, makes a record for an "open winter" up to this date that has not been approached during the last 75 years. The mean temperature of the past two months was more than 8 degrees above the average value for that period.

The mean dew point was more than eight degrees above the normal, and the relative humidity slightly greater than usual.

The total precipitation was more than one-half an inch greater than the normal, and practically all of it occurred as rain.

The total wind movement was considerably more than usual, and the daily movement on the 4th, following the low barometer of the 3d, was one of our largest daily records here. The prevailing direction of the wind was rather unusual for this season of the year.

J. E. OSTRANDER, Meteorologist.

H. W. ANGIER, Observer.

BULLETIN No. 290. FEBRUARY, 1913

# Meteorological Observations
AT THE
# MASSACHUSETTS
# AGRICULTURAL EXPERIMENT
# STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.
*Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.*
*Height of Wind Instruments 72 ft.*

## MONTHLY SUMMARY.

### **Pressure.** In inches.

| | |
|---|---|
| Maximum reduced to freezing, | 30.11, 2d, 11 A.; 10th, 11 A. |
| Minimum reduced to freezing, | 29.25, 23d, 1 A. |
| Reduced† maximum reading, | 30.44, 10th, 11 A.; |
| Reduced† minimum reading, | 29.56, 23d, 1 A. |
| Mean semi-daily reduced, | 30.008 |
| Monthly range, | 0.88 |

### ***Air Temperature.** In Degrees Fahr.

| | |
|---|---|
| Highest, | 55.0, 21st, 3 P. |
| Lowest, | -4.5, 10th, 7:30 A. |
| Mean hourly, | 22.7 |
| Mean of means of max. and min., | 22.7 |
| Mean sensible (wet bulb), | 19.4 |
| Monthly range, | 59.5 |
| Highest mean daily, | 41.5, 21st |
| Lowest mean daily, | 7.1, 10th |
| Mean maximum, | 32.2 |
| Mean minimum, | 13.3 |
| Mean daily range, | 18.9 |
| Greatest daily range, | 34.5, 11th |
| Least daily range, | 7.5, 22d |

### **Humidity.**

| | |
|---|---|
| Mean dew point, | 14.1 |
| Mean force of vapor, | .125 |
| Mean relative humidity, | 74.5 |

### **Precipitation.** In inches.

| | |
|---|---|
| Total precipitation, | 2.94 |
| Number of days on which .01 inch or more rain fell, | 7 |
| Total snow in inches | 11.0 |

*Temperature in ground shelter.
Reduced to freezing and sea-level.

### **Wind.**

| | |
|---|---|
| Total movement, | 5194m. |
| Greatest daily movement, | 445m., 1st |
| Least daily movement, | 23m., 11th |
| Mean daily movement, | 185 m |
| Mean hourly velocity, | 7.7 m |

Maximum pressure per square foot, 13.5 lbs.=52m. per hour, 1st, 1P., W.N.W.
Maximum velocity for 5 minutes, 36 m. per hour, 1st, 3 P., W.N.W.
Prevailing Direction, West.

### Summary.

| | |
|---|---|
| West | 18 per cent, |
| West Northwest | 18 " " |
| Northwest | 18 " " |
| Southwest | 14 " " |
| South | 11 " " |
| Other directions | 21 " " |

### **Weather.**

| | |
|---|---|
| Mean cloudiness observed, | 42 per cent. |
| Total cloudiness recorded by the Sun Thermometer, | 91 hrs.=31 per cent. |
| Number of clear days, | 13 |
| Number of fair days, | 11 |
| Number of cloudy days, | 4 |

### **Bright Sunshine.**

Number of hours recorded, . . 205 hrs=69%.

**Rain,** 21st, 22d, 27th, 28th.

**Snow,** 1st, 3d, 8th, 11th, 16th, 17th, 23d, 26th, 27th.

**Thunder and Lightning,** 22d.

**Days of Sleighing,** 15.

**Gales,** 35 or more miles per hour: 52 m, 1st, W.N.W.; 39m, 8th, W.S.W.; 36m., 9th, W.; 50m. 12th, W.N. W., 36 m., 23d, W.S.W.

# DAILY SUMMARY.

| Day. | Barometer Reduced to Sea Level. |  |  | Temperature. Ground Shelter. |  |  |  |  |  |  | No. of Hours Bright Sunshine |
|---|---|---|---|---|---|---|---|---|---|---|---|
|  | Maximun. | Minimum. | Mean. Semi-daily. | Maximum | Time. | Minimum. | Time. | Mean of Max. and Min. | Mean Hourly Draper. | Mean Sensible Wet Bulb. |  |
| 1 | 30.24 | 29.58 | 29.899 | 32.5 | 10 A | 16.5 | 12 P | 24.5 | 26 4 | 21.7 | 8 5 |
| 2 | 30.43 | 30.24 | 30.376 | 28.0 | 4 P | 14.0 | 5 A | 21.0 | 20.3 | 18.5 | 9.3 |
| 3 | 30.32 | 29.67 | 29.948 | 29.0 | 9 P | 20.0 | 3 A | 24 5 | 25.5 | 25.5 | 2.8 |
| 4 | 29.90 | 29.68 | 29 879 | 31.0 | 2 P | 12.0 | 12 P | 21.5 | 24.1 | 20.3 | 9.0 |
| 5 | 29.93 | 29 82 | 29.877 | 20.0 | 3 P | 7.0 | 12 P | 13.5 | 15.2 | 14.5 | 9.0 |
| 6 | 29.92 | 29.78 | 29.882 | 17.0 | 1 P | 5.0 | 1 A | 11.0 | 11.5 | 9.0 | 8.0 |
| 7 | 29.97 | 29.84 | 29.934 | 21.0 | 3 P | 3.0 | 5 A | 12.0 | 12.5 | 9 7 | 8.0 |
| 8 | 29.87 | 29.69 | 29 799 | 29.5 | 2:30 P | 10.0 | 3 A | 19.7 | 20.7 | 17.5 | 7.8 |
| 9 | 30.15 | 29.81 | 30.073 | 25.0 | 3 P | 11.5 | 7:30 A | 18.3 | 18.1 | 12.3 | 9 0 |
| 10 | 30.44 | 30.15 | 30.421 | 22.0 | 4 P | −4.5 | 7:30 A | 8 7 | 7.1 | 2.0 | 9.5 |
| 11 | 30.33 | 29.60 | 29.827 | 32.0 | 10 P | −2.5 | 3:30 A | 14.7 | 14.7 | 16.5 | 0.0 |
| 12 | 30.17 | 29.65 | 29 963 | 27.0 | 0 A | 6.5 | 12 P | 16.7 | 15.0 | 10.3 | 9.3 |
| 13 | 30.39 | 30.17 | 30.359 | 21.5 | 4 P | −1.0 | 7:30 A | 10.3 | 10.7 | 6.5 | 9 5 |
| 14 | 30.26 | 29.90 | 30.160 | 37.0 | 4 P | 8.0 | 7 A | 22.5 | 20.8 | 17.5 | 9.5 |
| 15 | 30.01 | 29.95 | 29.983 | 43.5 | 3 P | 13.0 | 7 A | 28.3 | 29 0 | 24.0 | 9.0 |
| 16 | 29.95 | 29.79 | 29.823 | 40.0 | 3:30 P | 26 0 | 7 A | 33.0 | 34.0 | 30 7 | 7.0 |
| 17 | 30 02 | 29.80 | 29.896 | 31.0 | 2 P | 18.0 | 12 P | 24.5 | 25.1 | 19.3 | 8.0 |
| 18 | 30.27 | 30.02 | 30.209 | 30 0 | 3 P | 11.0 | 7 A | 20.5 | 19 7 | 15 0 | 9.8 |
| 19 | 30.28 | 30.11 | 30.204 | 36 0 | 3:30 P | 8 0 | 7 A | 22.0 | 22 4 | 18 5 | 9 0 |
| 20 | 30.14 | 29 99 | 30.043 | 49.5 | 3 P | 27.0 | 7 A | 38.3 | 38 4 | 35.0 | 6.8 |
| 21 | 30.19 | 30.03 | 30.130 | 55 0 | 3 P | 33.0 | 7 A | 44 0 | 41.5 | 34.7 | 7.0 |
| 22 | 30.19 | 29 57 | 29.813 | 39.5 | 11 P | 32.0 | 7 A | 35.7 | 33.4 | 32.3 | 0.0 |
| 23 | 29 94 | 29 56 | 29.739 | 37.0 | 0 A | 16.5 | 12 P | 26.7 | 28.1 | 23.0 | 7.2 |
| 24 | 30 04 | 29.94 | 30 024 | 29.0 | 3 P | 12.5 | 12 P | 20 7 | 18.5 | 14.0 | 8.5 |
| 25 | 30.20 | 30.04 | 30.155 | 26.5 | 3 P | 7.5 | 6:30 A | 17.0 | 16.0 | 13.0 | 10.0 |
| 26 | 30.31 | 30 05 | 30 221 | 30.5 | 3:30 P | 6.5 | 6:30 A | 18 5 | 20 2 | 17.5 | 7.3 |
| 27 | 30.05 | 29.57 | 29.741 | 33.0 | 8 P | 24.0 | 0 A | 28.5 | 28.6 | 28 5 | 0.0 |
| 28 | 30.09 | 29.57 | 29.859 | 48.0 | 4 P | 32.5 | 0 A | 40.3 | 37.5 | 35.0 | 6.0 |

# DAILY SUMMARY.

| Day. | Humidity. | | | Wind. | | | | | Precipitation. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Mean Dew Point. | Mean Force vapor. | Mean Relative Humidity. | Prevailing Direction. | Total Movement in Miles. | Maximum Pressure Per Square Ft | Miles per Hour. | Time. | Beginning. | Ending. | Total in Inches. | |
| | | | | | | | | | | | Rain.** | Snow. |
| 1 | 17.0 | .131 | 76.0 | W. | 445 | 13.5 | 52 | 1 P | 10 A | 5 P | T | T |
| 2 | 15.0 | .109 | 82.0 | W. | 276 | 2.5 | 22 | 1 P | | | | |
| 3 | 21.5 | .146 | 83.0 | S.W. | 131 | 0.5 | 10 | 10 A | 8 A | 8 P | .69 | 6 |
| 4 | 12.0 | .125 | 65.0 | N.W. | 182 | 4.5 | 30 | 9 A | | | | |
| 5 | 10.0 | .091 | 78.5 | W.N.W. | 246 | 4.5 | 30 | 9 A | | | | |
| 6 | 0.5 | .075 | 61.5 | W. | 194 | 5.5 | 33 | 12 M | | | | |
| 7 | 4.5 | .076 | 74.5 | W. | 239 | 2.5 | 22 | 8 A | | | | |
| 8 | 10.0 | .112 | 65.0 | W.S.W. | 267 | 7.5 | 39 | 10 P | 6 P | 12 P | T | T |
| 9 | 5.0 | .086 | 67.0 | W.N.W. | 365 | 6.5 | 36 | 11 A | | | | |
| 10 | −1.5 | .052 | 83.0 | N. | 85 | 1.0 | 14 | 12 M | | | | |
| 11 | 14.0 | .100 | 87.5 | S.W. | 23 | 4.5 | 30 | 7 P | 5 A | 8 P | .28 | 2 |
| 12 | 2.0 | .081 | 63.0 | W.N.W. | 409 | 12.5 | 50 | 2 P | | | | |
| 13 | −1.0 | .068 | 66.5 | W.S.W. | 185 | 3.0 | 25 | 2 P | | | | |
| 14 | 11.0 | .113 | 70.0 | S. | 196 | 1.0 | 14 | 2 P | | | | |
| 15 | 19.0 | .152 | 73.5 | S. | 84 | 0.5 | 10 | 5 P | | | | |
| 16 | 28.5 | .179 | 90.0 | N.W. | 51 | 0.0 | — | — | 1 P | 12 P | T | T |
| 17 | 14.5 | .115 | 76.0 | N.N.E. | 188 | 1.5 | 17 | 5 A | 0 A | 2 A | T | T |
| 18 | 6.0 | .098 | 61.5 | N.N.W. | 304 | 4.5 | 30 | 2 P | | | | |
| 19 | 11.5 | .119 | 66.0 | N.W. | 72 | 0.0 | — | — | | | | |
| 20 | 31.0 | .232 | 79.5 | S.S.E. | 44 | 0.0 | — | — | | | | |
| 21 | 30.5 | .227 | 74.5 | S.W. | 62 | 0.0 | — | — | 6 P | 12 P | .03 | |
| 22 | 30.0 | .189 | 90.0 | N.W. | 79 | 0.0 | — | — | 0 A | 10 P | .63 | |
| 23 | 18.0 | .140 | 72.5 | W. | 368 | 6.5 | 36 | 1 P | 8 A | 3 P | T | T |
| 24 | 5.0 | .095 | 61.0 | W.N.W. | 235 | 1.0 | 14 | 6 P | | | | |
| 25 | 7.5 | .088 | 73.0 | W.N.W. | 194 | 1.0 | 14 | 8 A | | | | |
| 26 | 12.5 | .108 | 76.0 | S. | 103 | 1.0 | 14 | 6 P | 7 P | 12 P | .13 | 2 |
| 27 | 26.5 | .165 | 87.0 | S.W. | 70 | 0.0 | — | — | 0 A | 12 P | .90 | 1 |
| 28 | 32.0 | .221 | 83.0 | N.W. | 97 | 1.0 | 14 | 4 A | 0 A | 4 A | .28 | |

**Rain or meltedsnow at base of tower. *Included in following day.

# REMARKS

The weather during February was generally good winter weather, in marked contrast with the abnormal conditions of the preceding two months. Departures from normals were in most cases not especially marked and of little influence on the weather as a whole. During about half the month the sleighing was fair in this section.

A study of the records of the several weather elements for the month shows the following as the more important features. The mean barometer was slightly lower than the normal and the range unusually small for this time of the year. This was due to both a low maximum and high minimum. Notwithstanding the comparatively quiescent pressure the total wind movement was slightly greater than usual. All the gales were from nearly a westerly direction.

The mean temperature was slightly lower than the normal and the range was the usual amount. The thermometer registered below zero on three dates, all during the first half of the month. The first half of the month was considerably colder than the last half ; the records showing that during the first fourteen days the mean daily temperature was above the mean for the month on but three days while the last fourteen days had but five days when the daily mean was below the monthly mean.

The mean dew point and relative humidity were both considerably below the normals for these elements.

The total precipitation was about ten per cent. less than the normal and about two-thirds occurred as rain.

The amount of cloudiness was much below the average for February.

J. E. OSTRANDER, Meteorologist.

H. W. ANGIER, Observer.

BULLETIN No. 291. MARCH, 1913

# Meteorological Observations
AT THE
# MASSACHUSETTS
# AGRICULTURAL EXPERIMENT
# STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.
*Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.*
*Height of Wind Instruments 72 ft.*

## MONTHLY SUMMARY.

### **Pressure.** In inches.

| | |
|---|---|
| Maximum reduced to freezing, | 30.56, 18th, 8 A.; |
| Minimum reduced to freezing, | 28.96, 27th, 5 P. |
| Reduced† maximum reading, | 30.88, 18th, 8 A.; |
| Reduced† minimum reading, | 29.26, 27th, 5 P. |
| Mean semi-daily reduced, | 30.112 |
| Monthly range, | 1.92 |

### ***Air Temperature.** In Degrees Fahr.

| | |
|---|---|
| Highest, | 74.0, 25th, 3:30 P. |
| Lowest, | 1.0, 8th, 3 A. |
| Mean hourly, | 37.9 |
| Mean of means of max. and min., | 38.3 |
| Mean sensible (wet bulb), | 34.3 |
| Monthly range, | 73.0 |
| Highest mean daily, | 59.4, 25th |
| Lowest mean daily, | 9.4, 7th |
| Mean maximum, | 47.9 |
| Mean minimum. | 28.5 |
| Mean daily range, | 19.4 |
| Greatest daily range, | 35.5, 9th |
| Least daily range, | 4.0, 1st, 4th |

### **Humidity.**

| | |
|---|---|
| Mean dew point, | 30.7 |
| Mean force of vapor, | .236 |
| Mean relative humidity, | 79.3 |

### **Precipitation.** In inches.

| | |
|---|---|
| Total precipitation, | 6.38 |
| Number of days on which .01 inch or more rain fell, | 17 |
| Total snow in inches | 5.0 |

### **Wind.**

| | |
|---|---|
| Total movement, | 6413m. |
| Greatest daily movement, | 443m., 22d |
| Least daily movement, | 40m., 1st, 20th |
| Mean daily movement, | 207 m |
| Mean hourly velocity, | 8.6 m |

Maximum pressure per square foot, 23.5 lbs.= 68m. per hour, 31st, 3 P., S.W.

Maximum velocity for 5 minutes, 48 m. per hour, 27th, 9 P., W.

Prevailing Direction, West Southwest.

### Summary.

| | |
|---|---|
| West | 20 per cent, |
| South Southwest | 20 " " |
| South Southeast | 13 " " |
| South | 10 " " |
| West Southwest | 10 " " |
| Northwest | 10 " " |
| Other directions | 17 " " |

### **Weather.**

| | |
|---|---|
| Mean cloudiness observed, | 62 per cent. |
| Total cloudiness recorded by the Sun Thermometer, | 189 hrs.=51 per cent. |
| Number of clear days, | 10 |
| Number of fair days, | 8 |
| Number of cloudy days, | 13 |

### **Bright Sunshine.**

| | |
|---|---|
| Number of hours recorded, | 182 hrs=49%. |

**Rain.** 1st, 9th, 10th, 11th, 13th, 14th, 15th, 16th, 20th, 21st, 23d, 24th, 25th, 26th, 27th, 30th, 31st.

**Snow,** 2d, 4th, 6th, 11th.

**Thunder and Lightning,** 1st, 25th, 26th, 27th, 31st.

**Days of Sleighing,** 3.

**Gales,** 35 or more miles per hour: 64 m, 20th, W.N.W.; 44m, 6th, W.N.W.; 49m, 7th, W.; 43m. 21st, S.S.W.; 43m., 22d, W.; 36m. 24th, S.; 48m. 27th, W.; 39m. 28th, W.; 68m. 31st, S.W.

**Hail,** 31st.

---

*Temperature in ground shelter.
Reduced to freezing and sea-level.

# DAILY SUMMARY.

| Day. | Barometer Reduced to Sea Level. Maximun. | Minimum. | Mean. Semi-daily. | Temperature. Ground Shelter. Maximum | Time. | Minimum. | Time. | Mean of Max. and Min. | Mean Hourly Draper. | Mean Sensible Wet Bulb. | No. of Hours Bright Sunshine |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 30.08 | 29.79 | 29.946 | 34.0 | 8 P | 30.0 | 5 A | 32.0 | 33.7 | 32.0 | 0.0 |
| 2 | 30.19 | 29.72 | 29.934 | 37.0 | 2 P | 20.0 | 12 P | 28.5 | 29.0 | 23.3 | 8.3 |
| 3 | 30.32 | 30.04 | 30.200 | 37.0 | 4 P | 15.5 | 6 A | 26.3 | 27.3 | 22.5 | 8.0 |
| 4 | 30.20 | 29.91 | 30.094 | 35.0 | 2 P | 31.0 | 12 P | 33.0 | 32.6 | 30.5 | 0.0 |
| 5 | 29.92 | 29.85 | 29.904 | 44.0 | 3:30 P | 26.0 | 12 P | 35.0 | 33.3 | 29.7 | 9.5 |
| 6 | 29.85 | 29.46 | 29.689 | 36.0 | 3 P | 12.0 | 12 P | 24.0 | 23.5 | 21.5 | 2.0 |
| 7 | 30.38 | 29.83 | 30.194 | 13.5 | 1 P | 6.0 | 12 P | 9.7 | 9.4 | 6.7 | 10.2 |
| 8 | 30.44 | 30.21 | 30.370 | 29.5 | 3 P | 1.0 | 3 A | 15.3 | 16.2 | 13.0 | 9.5 |
| 9 | 30.21 | 29.91 | 30.044 | 59.0 | 3:30 P | 23.5 | 0 A | 41.3 | 40.4 | 37.5 | 8.7 |
| 10 | 30.24 | 30.04 | 30.172 | 49.5 | 3 P | 33.5 | 6:30 A | 41.5 | 41.0 | 35.3 | 8.0 |
| 11 | 30.15 | 29.87 | 29.962 | 45.5 | 4:30 P | 33.0 | 5 A | 39.3 | 36.9 | 35.0 | 7.0 |
| 12 | 30.44 | 30.15 | 30.392 | 53.0 | 3:30 P | 27.0 | 6:30 A | 40.0 | 38.9 | 33.3 | 10.5 |
| 13 | 30.45 | 30.25 | 30.369 | 44.5 | 4 P | 32.5 | 7 A | 38.5 | 37.4 | 36.0 | 0.5 |
| 14 | 30.25 | 29.73 | 29.895 | 57.0 | 5 P | 39.0 | 0 A | 48.0 | 46.5 | 47.3 | 0.0 |
| 15 | 29.75 | 29.45 | 29.576 | 57.0 | 4 P | 48.0 | 12 P | 52.5 | 53.2 | 53.3 | 0.0 |
| 16 | 30.01 | 29.56 | 29.776 | 47.0 | 2:30 P | 28.5 | 12 P | 37.7 | 39.9 | 34.5 | 2.3 |
| 17 | 30.75 | 30.01 | 30.527 | 37.5 | 12:30 P | 22.0 | 12 P | 29.7 | 28.6 | 23.3 | 10.5 |
| 18 | 30.88 | 30.55 | 30.732 | 46.5 | 3 P | 17.0 | 6:30 A | 31.7 | 31.8 | 27.5 | 10.5 |
| 19 | 30.55 | 30.31 | 30.431 | 64.0 | 3 P | 34.0 | 3 A | 49.0 | 47.4 | 41.7 | 11.0 |
| 20 | 30.35 | 29.95 | 30.078 | 52.0 | 6 P | 33.5 | 6 A | 42.7 | 43.5 | 42.7 | 0.0 |
| 21 | 30.08 | 30.07 | 29.938 | 65.0 | 3 P | 47.0 | 0 A | 56.0 | 55.5 | 55.3 | 1.2 |
| 22 | 30.63 | 29.90 | 30.405 | 41.5 | 2 P | 28.5 | 12 P | 35.0 | 37.9 | 28.7 | 11.0 |
| 23 | 30.80 | 30.43 | 30.672 | 47.0 | 2:30 P | 22.0 | 6 A | 34.5 | 35.0 | 30.7 | 9.5 |
| 24 | 30.43 | 29.98 | 30.073 | 69.5 | 2:30 P | 37.0 | 0 A | 53.3 | 55.0 | 51.7 | 7.3 |
| 25 | 30.04 | 29.78 | 29.945 | 74.0 | 3:30 P | 50.0 | 12 P | 62.0 | 59.4 | 56.5 | 8.5 |
| 26 | 30.11 | 29.93 | 30.042 | 50.0 | 0 A | 36.5 | 6 A | 43.3 | 39.4 | 37.3 | 0.0 |
| 27 | 29.93 | 29.26 | 29.594 | 60.5 | 2 P | 30.0 | 12 P | 45.3 | 42.9 | 33.7 | 0.0 |
| 28 | 30.39 | 29.67 | 30.257 | 39.0 | 4 P | 27.0 | 6 A | 33.0 | 31.2 | 26.7 | 11.5 |
| 29 | 30.55 | 30.37 | 30.484 | 48.0 | 4 P | 22.0 | 6:30 A | 35.0 | 34.1 | 29.3 | 11.0 |
| 30 | 30.37 | 29.98 | 30.189 | 56.0 | 3 P | 32.0 | 3 A | 44.0 | 44.6 | 42.0 | 5.0 |
| 31 | 29.98 | 29.35 | 29.592 | 58.0 | 2:30 P | 40.5 | 12 P | 49.3 | 48.1 | 46.3 | 0.0 |

# DAILY SUMMARY.

| Day. | Humidity. | | | Wind. | | | | | Precipitation. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Total in Inches. | |
| | Mean Dew Point. | Mean Force vapor. | Mean Relative Humidity. | Prevailing Direction. | Total Movement in Miles. | Maximum Pressure Per Square Ft | Miles per Hour. | Time. | Beginning. | Ending. | Rain.** | Snow. |
| 1 | 30.0 | .188 | 90.0 | N.N.E. | 40 | 0.0 | — | — | 10 A | 9 P | .17 | |
| 2 | 17.0 | .141 | 70.0 | N.W. | 253 | 20.5 | 64 | 2 P | 3 P | 4 P | T | T |
| 3 | 16.0 | .145 | 66.5 | W. | 360 | 5.5 | 33 | 1 A | | | | |
| 4 | 27.5 | .180 | 85.0 | W.N.W. | 76 | 0.0 | — | — | 6 P | 11 P | .06 | 1 |
| 5 | 26.5 | .175 | 82.0 | N.N.E. | 41 | 0.0 | — | — | | | | |
| 6 | 17.0 | .127 | 77.0 | N.W. | 122 | 9.5 | 44 | 1:30 P | 8 A | 4 P | .41 | 4 |
| 7 | −1.0 | .066 | 63.0 | W. | 414 | 12.0 | 49 | 8 A | | | | |
| 8 | 7.0 | .094 | 72.5 | S. | 154 | 1.0 | 14 | 10 P | | | | |
| 9 | 35.0 | .249 | 86.5 | S. | 283 | 4.5 | 30 | 4 P | 6 P | 10 P | T | |
| 10 | 29.0 | .234 | 70.5 | W.S.W. | 129 | 2.0 | 20 | 4 A | 11 P | 12 P | .06 | |
| 11 | 33.0 | .211 | 91.5 | N.E. | 74 | 0.0 | — | — | 0 A | 11 A | .38 | T |
| 12 | 29.0 | .213 | 76.0 | W.S.W. | 60 | 0.0 | — | — | | | | |
| 13 | 34.0 | .222 | 91.5 | S.S.E. | 48 | 1.0 | 14 | 2 P | 11 A | 1 P | T | |
| 14 | 47.0 | .339 | 96.0 | S.S.E. | 64 | 1.0 | 14 | 4 A | 1 A | 3 P | .89 | |
| 15 | 53.0 | .412 | 98.5 | S.S.W. | 269 | 3.0 | 24 | 3 P | 12 M | 12 P | .20 | |
| 16 | 31.0 | .219 | 80.0 | N.W. | 136 | 4.5 | 30 | 10 P | 0 A | 7 P | .11 | |
| 17 | 15.0 | .144 | 62.5 | W. | 354 | 4.5 | 30 | 1 P | | | | |
| 18 | 21.5 | .175 | 69.5 | S.S.W. | 264 | 5.0 | 32 | 12 M | | | | |
| 19 | 36.0 | .315 | 67.5 | S.S.W. | 347 | 4.0 | 28 | 2 P | | | | |
| 20 | 42.0 | .288 | 94.5 | S.S.W. | 40 | 0.0 | — | — | 6 A | 7 P | .62 | |
| 21 | 54.5 | .455 | 94.5 | S.S.W. | 197 | 9.0 | 43 | 5 P | 3 P | 8 P | .02 | |
| 22 | 18.0 | .194 | 52.5 | W. | 443 | 9.0 | 43 | 8 A | | | | |
| 23 | 26.0 | .194 | 73.0 | S.S.E. | 190 | 2.5 | 22 | 6 P | 11 P | 12 P | .06 | |
| 24 | 49.0 | .432 | 80.5 | S.S.E. | 374 | 6.5 | 36 | 10 A | 0 A | 5 A | .28 | |
| 25 | 56.0 | .487 | 90.0 | S.S.W. | 365 | 5.0 | 32 | 3 P | 6 P | 12 P | .26 | |
| 26 | 35.5 | .233 | 89.5 | N.N.W. | 92 | 2.0 | 20 | 11 A | 0 A | 12 P | 1.04 | |
| 27 | 30.5 | .208 | 82.0 | W. | 218 | 11.5 | 48 | 8 P | 0 A | 6 P | 1.14 | |
| 28 | 20.5 | .163 | 70.5 | W. | 416 | 7.5 | 39 | 6 A | | | | |
| 29 | 22.0 | .186 | 65.5 | W.S.W. | 123 | 2.5 | 22 | 7 P | | | | |
| 30 | 49.5 | .296 | 84.5 | S. | 242 | 2.0 | 20 | 3 P | 4 P | 12 P | .04 | |
| 31 | 44.0 | .345 | 86.0 | S.W. | 225 | 23.5 | 68 | 3 P | 0 A | 8 P | .64 | |

**Rain or melted snow at base of tower. *Included in following day.

## REMARKS

With the close of the winter season a comparison of the temperature record with that of former winters can safely be made. Taking the season as a whole from the 1st of December to the close of this month it can safely be said that it was the mildest winter within the memory of the "oldest inhabitant." Using the temperature records of this town, which extend back to 1837, no previous year shows such a high mean temperature for the four months. The winter of 1879–80, however, was almost as mild. The months of December, January and March were all a few degrees colder than the corresponding months of the past season. February, however, of that year was more than seven degrees warmer than the same month this year. The maximum and minimum temperatures of that winter were both several degrees lower than those records of the season just closed. February stands out as the only month of the winter when the temperature conditions were nearly normal.

March started out with a thunderstorm on the 1st, and snow on the 4th and 6th. The latter snowstorm furnished sleighing for only a few days as the temperature rose to 59 degrees on the 9th. Before the middle of the month the frost was practically all out of the ground and the rains about that time settled the roads so that they were fairly passable. The equinoctial storms were comparatively light and the transition to spring was practically completed by them.

The last week of the month was unusually stormy with a number of heavy rains and severe thunder and lightning on several days and on the 31st there was a severe hailstorm with thunder and lightning and the heaviest wind of the month. The total precipitation was two and one-half inches above normal.

The month closed with the season fully two weeks in advance of the usual conditions at the end of March.

J. E. OSTRANDER, Meteorologist.

H. W. ANGIER, Observer.

BULLETIN No. 292. APRIL, 1913

# Meteorological Observations
AT THE
# MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.
*Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.*
*Height of Wind Instruments 72 ft.*

## MONTHLY SUMMARY.

### **Pressure.** In inches.

| | |
|---|---|
| Maximum reduced to freezing, | 30.25, 10th, 7 A. |
| Minimum reduced to freezing, | 29.19, 1st, 0 A. |
| Reduced† maximum reading, | 30.56, 10th, 7 A.; |
| Reduced† minimum reading, | 29.50, 1st, 0 A. |
| Mean semi-daily reduced, | 30.020 |
| Monthly range, | 1.06 |

### ***Air Temperature.** In Degrees Fahr.

| | |
|---|---|
| Highest, | 84.5, 25th, 2:30 P. |
| Lowest, | 22.5, 8th, 6 A. |
| Mean hourly, | 47.6 |
| Mean of means of max. and min., | 48.0 |
| Mean sensible (wet bulb), | 42.9 |
| Monthly range, | 62.0 |
| Highest mean daily, | 65.9, 25th |
| Lowest mean daily, | 34.2, 9th |
| Mean maximum, | 58.3 |
| Mean minimum, | 37.6 |
| Mean daily range, | 20.7 |
| Greatest daily range, | 38.0, 22d |
| Least daily range, | 6.5, 13th |

### **Humidity.**

| | |
|---|---|
| Mean dew point, | 38.5 |
| Mean force of vapor, | .338 |
| Mean relative humidity, | 74.4 |

### **Precipitation.** In inches.

| | |
|---|---|
| Total precipitation, | 3.30 |
| Number of days on which .01 inch or more rain fell, | 14 |
| Total snow in inches | trace |

*Temperature in ground shelter.
†Reduced to freezing and sea-level.

### **Wind.**

| | |
|---|---|
| Total movement, | 5659m. |
| Greatest daily movement, | 542m., 2d |
| Least daily movement, | 32m., 12th |
| Mean daily movement, | 189 m |
| Mean hourly velocity, | 7.9 m |

Maximum pressure per square foot, 16.5 lbs.= 58m. per hour, 1st, 8 P., W.N.W.
Maximum velocity for 5 minutes, 30 m. per hour, 1st, 9 P., W.N.W.
Prevailing Direction, West Northwest.

### Summary.

| | |
|---|---|
| West | 13 per cent. |
| South Southwest | 13 " " |
| North Northwest | 10 " " |
| Northwest | 10 " " |
| Northeast | 10 " " |
| Other directions | 44 " " |

### **Weather.**

| | |
|---|---|
| Mean cloudiness observed, | 55 per cent |
| Total cloudiness recorded by the Sun Thermometer, | 191 hrs.=48 per cent. |
| Number of clear days, | 8 |
| Number of fair days, | 12 |
| Number of cloudy days, | 10 |

### **Bright Sunshine.**

Number of hours recorded, . . 211 hrs=52%.

**Rain**, 3d, 4th, 5th, 6th, 7th, 9th, 11th, 12th, 13th, 16th, 19th, 23d, 25th, 28th, 29th.

**Snow**, 6th, 7th, 9th.

**Frosts**, 7th, 10th, 22d.

**Thunder and Lightning**, none.

**Gales**, 35 or more miles per hour: 58 m, 1st, W.N.W.; 40m, 2d, W.S.W.; 38m., 19th, W.; 39m., 30th, N.

# DAILY SUMMARY.

| Day. | Barometer Reduced to Sea Level. | | | Temperature. Ground Shelter. | | | | | | | No. of Hours Bright Sunshine. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Maximun. | Minimum. | Mean. Semi-daily. | Maximum | Time. | Minimum. | Time. | Mean of Max. and Min. | Mean Hourly Draper. | Mean Sensible Wet Bulb. | |
| 1 | 29.70 | 29.50 | 29.610 | 46.0 | 2:30 P | 34.5 | 7 A | 40.3 | 37.8 | 31.3 | 4.0 |
| 2 | 30.14 | 29.70 | 29.969 | 50.0 | 12 M | 36.0 | 1 A | 43.0 | 41.5 | 33.7 | 11.0 |
| 3 | 30.23 | 30.08 | 30.162 | 55.5 | 5 P | 34.5 | 2 A | 45.0 | 43.0 | 38.7 | 6.0 |
| 4 | 30.14 | 29.97 | 30.070 | 54.0 | 3 P | 38.0 | 7 A | 46.0 | 43.9 | 39.7 | 3.3 |
| 5 | 30.00 | 29.89 | 29.979 | 52.5 | 2:30 P | 34.5 | 12 P | 43.5 | 42.9 | 37.3 | 7.3 |
| 6 | 29.99 | 29.81 | 29.922 | 43.5 | 1 P | 27.0 | 5:30 A | 35.3 | 34.6 | 31.0 | 4.0 |
| 7 | 30.18 | 29.88 | 30.081 | 42.0 | 1 P | 28.0 | 12 P | 35.0 | 35.6 | 32.0 | 5.5 |
| 8 | 30.22 | 30.04 | 30.164 | 47.5 | 4 P | 22.5 | 6 A | 35.0 | 35.8 | 32.0 | 11.0 |
| 9 | 30.49 | 30.12 | 30.409 | 44.5 | 5 P | 26.0 | 6 A | 35.3 | 34.2 | 29.0 | 11.3 |
| 10 | 30.56 | 30.39 | 30.477 | 53.0 | 4 P | 23.0 | 6 A | 38.0 | 38.7 | 35.7 | 10.0 |
| 11 | 30.39 | 30.10 | 30.248 | 43.5 | 8 P | 36.0 | 6 A | 39.7 | 39.1 | 39.3 | 0.0 |
| 12 | 30.10 | 29.94 | 29.905 | 62.5 | 3 P | 42.0 | 0 A | 52.3 | 53.0 | 51.5 | 2.8 |
| 13 | 29.97 | 29.75 | 29.834 | 52.5 | 1:30 P | 46.0 | 8 A | 49.3 | 48.8 | 47.0 | 0.2 |
| 14 | 29.94 | 29.74 | 29.853 | 57.0 | 2 P | 43.0 | 3 A | 50.0 | 51.0 | 48.5 | 2.3 |
| 15 | 30.00 | 29.81 | 29.949 | 62.0 | 2 P | 46.0 | 6 A | 54.0 | 52.1 | 46.0 | 8.2 |
| 16 | 29.81 | 29.62 | 29.678 | 54.0 | 3 P | 43.0 | 11 P | 48.5 | 47.8 | 42.3 | 0.0 |
| 17 | 30.05 | 29.71 | 29.935 | 62.5 | 3:30 P | 39.0 | 12 P | 50.7 | 49.5 | 41.5 | 12.0 |
| 18 | 30.14 | 29.85 | 30.033 | 64.0 | 3 P | 30.0 | 6 A | 47.0 | 48.3 | 45.5 | 10.0 |
| 19 | 29.95 | 29.65 | 29.838 | 62.5 | 11 A | 35.0 | 12 P | 48.7 | 48.1 | 42.5 | 7.0 |
| 20 | 30.23 | 29.93 | 30.074 | 41.0 | 2 P | 30.5 | 8 A | 35.7 | 35.2 | 30.0 | 9.5 |
| 21 | 30.41 | 30.23 | 30.332 | 57.5 | 3 P | 28.5 | 4:30 A | 43.0 | 44.0 | 37.3 | 11.8 |
| 22 | 30.27 | 30.04 | 30.163 | 70.0 | 3 P | 32.0 | 6 A | 51.0 | 53.0 | 48.5 | 9.0 |
| 23 | 30.17 | 30.01 | 30.090 | 75.0 | 3 P | 50.0 | 7 A | 62.5 | 60.2 | 53.5 | 6.7 |
| 24 | 30.21 | 30.08 | 30.177 | 82.0 | 4 P | 44.5 | 6 A | 63.3 | 63.3 | 57.0 | 11.0 |
| 25 | 30.16 | 30.03 | 30.137 | 84.5 | 2:30 P | 52.0 | 6 A | 68.3 | 65.9 | 60.0 | 8.8 |
| 26 | 30.15 | 30.04 | 30.089 | 76.0 | 2 P | 48.5 | 6 A | 62.3 | 61.5 | 55.3 | 11.8 |
| 27 | 30.04 | 29.85 | 29.913 | 72.5 | 1:30 P | 45.0 | 5:30 A | 58.7 | 60.3 | 56.0 | 10.2 |
| 28 | 29.85 | 29.66 | 29.723 | 59.5 | 2:30 P | 49.0 | 12 P | 54.3 | 55.1 | 52.0 | 1.0 |
| 29 | 30.01 | 29.68 | 29.772 | 63.0 | 2:30 P | 46.0 | 5 A | 54.5 | 53.7 | 51.7 | 3.0 |
| 30 | 30.05 | 29.90 | 30.021 | 59.0 | 4:30 P | 38.0 | 5 A | 48.5 | 49.0 | 41.7 | 12.0 |

# DAILY SUMMARY.

| Day. | Humidity. | | | Wind. | | | | | Precipitation. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Total in Inches. | |
| | Mean Dew Point. | Mean Force vapor. | Mean Relative Humidity. | Prevailing Direction. | Total Movement in Miles. | Maximum Pressure Per Square Ft | Miles per Hour. | Time. | Beginning. | Ending. | Rain.** | Snow. |
| 1 | 22.5 | .212 | 58.0 | W. | 458 | 16.5 | 58 | 8 P | | | | |
| 2 | 22.0 | .248 | 50.0 | W.S.W. | 542 | 8.0 | 40 | 11 A | | | | |
| 3 | 34.5 | .275 | 72.5 | E.S.E. | 60 | 0.0 | — | — | 9 P | 12 P | .01 | |
| 4 | 37.5 | .266 | 84.5 | N.N.E. | 115 | 0.0 | — | — | 0 A | 7 A | .05 | |
| 5 | 32.5 | .248 | 76.0 | N.W. | 147 | 2.5 | 22 | 5 P | 0 A | 8 A | .43 | |
| 6 | 31.5 | .244 | 78.0 | W. | 70 | 1.0 | 14 | 9 P | 8 A | 3 P | .03 | T |
| 7 | 26.0 | .208 | 68.5 | N.W. | 251 | 4.5 | 30 | 12 M | 2 P | 4 P | T | T |
| 8 | 25.5 | .210 | 67.0 | W.N.W. | 168 | 5.5 | 33 | 11 P | | | | |
| 9 | 22.5 | .181 | 67.5 | N.W. | 297 | 5.0 | 32 | 10 A | 1 A | 3 A | .01 | T |
| 10 | 30.5 | .239 | 73.5 | N.N.W. | 49 | 0.0 | — | — | | | | |
| 11 | 38.5 | .247 | 96.0 | S.S.E. | 150 | 0.5 | 10 | 2 P | 3 A | 12 P | 1.12 | |
| 12 | 50.0 | .418 | 85.5 | S.S.W. | 32 | 0.0 | — | — | 0 A | 9 A | .66 | |
| 13 | 46.5 | .329 | 96.5 | N. | 152 | 0.0 | — | — | 3 A | 11 P | .38 | |
| 14 | 46.5 | .378 | 85.5 | N.N.E. | 103 | 0.0 | — | — | | | | |
| 15 | 42.0 | .359 | 75.5 | N.E. | 187 | 2.0 | 20 | 9 A | | | | |
| 16 | 36.5 | .320 | 68.5 | N.E. | 131 | 1.0 | 14 | 2 A | 8 A | 9 A | .03 | |
| 17 | 34.5 | .324 | 62.0 | N.N.W. | 271 | 3.5 | 26 | 4 A | | | | |
| 18 | 43.5 | .330 | 89.0 | W.S.W. | 244 | 5.0 | 32 | 2 P | | | | |
| 19 | 38.5 | .312 | 77.0 | W.S.W. | 346 | 7.0 | 38 | 4 P | 1 A | 3 A | .06 | |
| 20 | 23.5 | .191 | 69.5 | W. | 415 | 5.5 | 33 | 3 P | | | | |
| 21 | 27.0 | .292 | 50.5 | W. | 179 | 3.0 | 24 | 10 A | | | | |
| 22 | 43.0 | .419 | 70.0 | S. | 103 | 0.0 | — | — | | | | |
| 23 | 49.0 | .509 | 71.5 | S.W. | 86 | 0.0 | — | — | 7 A | 9 A | .04 | |
| 24 | 54.5 | .550 | 77.5 | W.S.W. | 44 | 0.0 | — | — | | | | |
| 25 | 57.5 | .605 | 79.5 | S.E. | 59 | 0.0 | — | — | 3 P | 3:30 P | .03 | |
| 26 | 51.0 | .523 | 72.5 | S. | 165 | 1.0 | 14 | 3 P | | | | |
| 27 | 53.0 | .507 | 79.5 | E.S.E. | 156 | 1.5 | 17 | 5 P | | | | |
| 28 | 49.5 | .430 | 83.0 | E. | 135 | 0.0 | — | — | 3 A | 12 M | .29 | |
| 29 | 50.0 | .417 | 86.0 | N.E. | 161 | 4.5 | 30 | 3 P | 8 A | 8 P | .16 | |
| 30 | 34.5 | .334 | 60.0 | N.N.W. | 383 | 7.5 | 39 | 10 A | | | | |

**Rain or melted snow at base of tower. *Included in following day.

# REMARKS

The weather during April proved disappointing to those who had expected an early season. Much of the seasonal progress shown at the beginning of the month was lost before the month closed. While no particular weather element seemed especially abnormal, the advance of spring was arrested and conditions were nearly normal at the end of the month.

The first half of the month was much more rainy than the last half, although precipitation was well distributed throughout the month.

The record of the several weather elements shows the following as the more important features: The mean barometer was higher than the normal and the range a little less than the usual amount. The maximum and minimum pressures were both higher than the average value of these records. The minimum record was made as the month opened, and was followed by a wind record of a thousand miles on the first two days of the month. The total wind movement was slightly greater than the normal and the daily prevailing direction more variable than usual.

The mean temperature was about two degrees above the normal, and the maximum and minimum records both high. Only a few frosts were noted, and no damage was done by them. From the 21st to the 29th, inclusive, was the warmest period of the month.

The mean dew point was practically normal, while the relative humidity was considerably higher than usual.

The total precipitation was about ten per cent more than the normal, and two-thirds of the total fell from the 11th to the 13th, inclusive. While many showers occurred no thunder storms were noted.

The percentage of cloudiness observed was slightly more than the normal.

J. E. OSTRANDER, Meteorologist.

H. W. ANGIER, Observer.

**BULLETIN No. 293. MAY, 1913**

# Meteorological Observations
AT THE
# MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.
*Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.*
*Height of Wind Instruments 72 ft.*

---

## MONTHLY SUMMARY.

### Pressure. In inches.

| | |
|---|---|
| Maximum reduced to freezing, | 30.10, 4th, 12 P. |
| Minimum reduced to freezing, | 29.23, 29th, 2 P. |
| Reduced† maximum reading, | 30.39, 4th, 12 P. |
| Reduced† minimum reading, | 29.52, 29th, 2 P. |
| Mean semi-daily reduced, | 29.995 |
| Monthly range, | 0.87 |

### *Air Temperature. In Degrees Fahr.

| | |
|---|---|
| Highest, | 89.0, 3d, 4 P. |
| Lowest, | 30.5, 11th, 2:30 A. |
| Mean hourly, | 55.6 |
| Mean of means of max. and min., | 55.5 |
| Mean sensible (wet bulb), | 50.4 |
| Monthly range, | 58.5 |
| Highest mean daily, | 73.2, 3d |
| Lowest mean daily, | 41.3, 10th |
| Mean maximum, | 66.6 |
| Mean minimum, | 44.3 |
| Mean daily range, | 22.3 |
| Greatest daily range, | 43.5, 2d |
| Least daily range, | 4.5, 28th |

### Humidity.

| | |
|---|---|
| Mean dew point, | 46.0 |
| Mean force of vapor, | .445 |
| Mean relative humidity, | 73.0 |

### Precipitation. In inches.

| | |
|---|---|
| Total precipitation, | 4.94 |
| Number of days on which .01 inch or more rain fell, | 13 |

*Temperature in ground shelter.
†Reduced to freezing and sea-level.

### Wind.

| | |
|---|---|
| Total movement, | 3672m. |
| Greatest daily movement, | 289m., 19th |
| Least daily movement, | 14m., 22d |
| Mean daily movement, | 118 m |
| Mean hourly velocity, | 4.9 m |

Maximum pressure per square foot, 5.5 lbs.= 33m. per hour, 29th, 1 P., N.W.
Maximum velocity for 5 minutes, 30 m. per hour, 29th, 5P., N.W.
Prevailing Direction, Northwest.

### Summary.

| | |
|---|---|
| North Northwest | 19 per cent. |
| Northwest | 16 " " |
| West Northwest | 13 " " |
| South Southeast | 13 " " |
| Other directions | 39 " " |

### Weather.

| | |
|---|---|
| Mean cloudiness observed, | 53 per cent. |
| Total cloudiness recorded by the Sun Thermometer, | 232 hrs.=51 per cent. |
| Number of clear days, | 6 |
| Number of fair days, | 14 |
| Number of cloudy days, | 11 |

### Bright Sunshine.

Number of hours recorded, 221 hrs=49%.

**Rain**, 6th, 9th, 13th, 15th, 16th, 18th, 21st, 22d, 23d, 24th, 25th, 27th, 28th, 29th.

**Frosts**, 11th, 12th, 15th.

**Thunder and Lightning**, 6th, 15th.

**Gales**, 35 or more miles per hour: None.

# DAILY SUMMARY.

| Day. | Barometer Reduced to Sea Level. | | | Temperature. Ground Shelter. | | | | | | | No. of Hours Bright Sunshine. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Maximun. | Minimum. | Mean. Semi-daily. | Maximum | Time. | Minimum. | Time. | Mean of Max. and Min. | Mean Hourly Draper. | Mean Sensible Wet Bulb. | |
| 1 | 30.07 | 29.92 | 30.006 | 73.5 | 4:30 P | 33.0 | 6 A | 53.3 | 55.6 | 51.3 | 10.5 |
| 2 | 29.99 | 29.84 | 29.952 | 87.5 | 3 P | 44.0 | 5 A | 65.7 | 68.1 | 59.5 | 11.2 |
| 3 | 30.13 | 29.93 | 30.031 | 89.0 | 4 P | 53.0 | 4:30 A | 71.0 | 73.2 | 60.3 | 11.5 |
| 4 | 30.39 | 30.13 | 30.386 | 75.5 | 4 P | 54.0 | 6 A | 64.7 | 62.8 | 56.5 | 7.5 |
| 5 | 30.39 | 30.11 | 30.245 | 76.5 | 2:30 P | 56.0 | 6 A | 66.3 | 63.7 | 57.5 | 7.5 |
| 6 | 30.11 | 29.84 | 29.959 | 87.0 | 4 P | 52.0 | 5:30 A | 69.5 | 67.5 | 60 0 | 10.5 |
| 7 | 30.13 | 29.87 | 29.998 | 71.0 | 2 P | 49.5 | 12 P | 60.3 | 61 9 | 53.5 | 10.5 |
| 8 | 30.29 | 30.13 | 30.246 | 68.0 | 5 P | 38.0 | 6 A | 53.0 | 53.5 | 49.5 | 12.0 |
| 9 | 30.23 | 29.99 | 30.076 | 62.5 | 4 P | 46.5 | 3 A | 54.5 | 52.0 | 45.5 | 3.8 |
| 10 | 30.06 | 29.98 | 30.052 | 49.0 | 3:30 P | 32.0 | 12 P | 40.5 | 41.3 | 34.3 | 6.0 |
| 11 | 30.02 | 29.88 | 29.954 | 56.5 | 3 P | 30.5 | 2:30 A | 43.5 | 43.9 | 38.7 | 9.3 |
| 12 | 30.02 | 29.88 | 29.966 | 65.0 | 6 P | 31.0 | 6 A | 48.0 | 49.8 | 46.3 | 11.8 |
| 13 | 29.95 | 29.76 | 29 879 | 68.0 | 3 P | 42.5 | 5:30 A | 55.3 | 53.9 | 47.7 | 4.0 |
| 14 | 30.17 | 29.87 | 29.997 | 69 0 | 5 P | 45.5 | 12 P | 57.3 | 57.3 | 52.3 | 12.0 |
| 15 | 30.27 | 30.07 | 30.181 | 61.0 | 2 P | 34.0 | 6 A | 47.5 | 49.7 | 44.0 | 7.0 |
| 16 | 30.07 | 29.88 | 29.939 | 51.0 | 0 A | 43.0 | 12 P | 47.0 | 46.5 | 44.5 | 0.0 |
| 17 | 30.17 | 30.05 | 30.125 | 56 5 | 4 P | 42 0 | 1 A | 49.3 | 48.5 | 46.0 | 2.9 |
| 18 | 30.13 | 29.87 | 29.946 | 60.5 | 5:30 P | 46.0 | 4 A | 53.3 | 51.8 | 45 5 | 2.7 |
| 19 | 30.07 | 29.87 | 29.962 | 60.0 | 1 P | 43.5 | 12 P | 51.7 | 53.0 | 46.5 | 9.0 |
| 20 | 30.18 | 30.04 | 30.121 | 67.0 | 5 P | 37.0 | 5 A | 52.0 | 53.6 | 49.0 | 11.5 |
| 21 | 30.23 | 30.10 | 30.180 | 65.0 | 3 P | 37.0 | 5 A | 51.0 | 53.1 | 50.5 | 5.0 |
| 22 | 30.10 | 29 83 | 29.919 | 57.0 | 6 P | 49 0 | 5 A | 53.0 | 53.0 | 52.3 | 0.0 |
| 23 | 29.89 | 29.79 | 29 849 | 63.5 | 3 P | 54.0 | 0 A | 58.7 | 57.4 | 56.7 | 0.0 |
| 24 | 29.84 | 29.77 | 29.823 | 64.5 | 12:30 P | 55.0 | 3 A | 59.7 | 57.7 | 55.0 | 1.7 |
| 25 | 30.00 | 29.83 | 29.899 | 70.0 | 3 P | 50.0 | 5 A | 60.0 | 60.0 | 53.7 | 12.0 |
| 26 | 30.10 | 30.00 | 30.072 | 70.0 | 5 P | 41.0 | 5 A | 55.5 | 55.7 | 48.3 | 11.3 |
| 27 | 30.17 | 30.09 | 30.142 | 55.5 | 11 A | 45.5 | 5:30 A | 50.5 | 51.0 | 49.3 | 0.0 |
| 28 | 30.09 | 29.68 | 29.855 | 53.5 | 11:30 A | 49.0 | 3 A | 51.3 | 51.0 | 48.7 | 0.0 |
| 29 | 29.68 | 29.52 | 29.587 | 62.0 | 2:30 P | 49.0 | 5 A | 55.5 | 55.6 | 52.3 | 6.8 |
| 30 | 29.75 | 29.61 | 29.668 | 73.5 | 5 P | 46.0 | 5 A | 59.7 | 59.4 | 52.3 | 12.0 |
| 31 | 29.94 | 29.75 | 29.826 | 76.5 | 4:30 P | 44.0 | 6 A | 60.3 | 61.5 | 56.0 | 10.5 |

# DAILY SUMMARY.

| Day. | Humidity. | | | Wind. | | | | | Precipitation. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Mean Dew Point. | Mean Force vapor. | Mean Relative Humidity. | Prevailing Direction. | Total Movement in Miles. | Maximum Pressure Per Square Ft | Miles per Hour. | Time. | Beginning. | Ending. | Total in Inches. | |
| | | | | | | | | | | | Rain.** | Snow. |
| 1 | 46.0 | .475 | 67.0 | N.N.W. | 102 | 1.5 | 17 | 11 A | | | | |
| 2 | 56.0 | .654 | 70.5 | W.N.W. | 79 | 2.5 | 22 | 2 P | | | | |
| 3 | 54.0 | .749 | 56.5 | W.N.W. | 61 | 1.0 | 14 | 11 A | | | | |
| 4 | 54.5 | .505 | 84.5 | S.W. | 93 | 0.0 | — | — | | | | |
| 5 | 54.5 | .551 | 78.5 | S. | 136 | 0.0 | — | — | | | | |
| 6 | 57.5 | .590 | 80.5 | S. | 43 | 3.5 | 26 | 6 P | 7 P | 11 P | .12 | |
| 7 | 48.0 | .509 | 67.0 | N.N.E. | 226 | 2.0 | 20 | 8 A | | | | |
| 8 | 44.0 | .433 | 67.5 | N.N.W. | 111 | 2.0 | 20 | 6 P | | | | |
| 9 | 39.5 | .358 | 71.0 | W. | 280 | 4.5 | 30 | 3 P | 7 A | 9 A | .02 | |
| 10 | 27.5 | .231 | 66.0 | N.N.W. | 253 | 4.0 | 28 | 5 P | | | | |
| 11 | 29.5 | .304 | 54.0 | N.W. | 247 | 3.5 | 26 | 7 A | | | | |
| 12 | 38.0 | .407 | 57.0 | N.W. | 76 | 0.5 | 10 | 1 P | | | | |
| 13 | 42.0 | .402 | 67.0 | S.S.E. | 170 | 3.0 | 24 | 5 P | 12 M | 7 P | .04 | |
| 14 | 47.0 | .483 | 66.5 | N.W. | 179 | 2.0 | 20 | 4 P | | | | |
| 15 | 37.0 | .361 | 61.0 | E. | 99 | 0.0 | — | — | 10 P | 12 P | .04 | |
| 16 | 43.5 | .310 | 90.5 | E. | 54 | 0.0 | — | — | 0 A | 11 A | .36 | |
| 17 | 44.0 | .347 | 83.0 | S.S.E. | 64 | 0.0 | — | — | | | | |
| 18 | 41.0 | .369 | 68.0 | S.S.E. | 34 | 0.0 | — | — | 12 M | 4 P | T | |
| 19 | 39.5 | .400 | 61.0 | W. | 289 | 5.0 | 32 | 11 A | | | | |
| 20 | 42.0 | .447 | 59.5 | W.N.W. | 150 | 3.0 | 24 | 4 P | | | | |
| 21 | 48.0 | .397 | 86.5 | S.W. | 43 | 0.0 | — | — | 3 P | 12 P | .10 | |
| 22 | 52.0 | .399 | 97.0 | S.S.E. | 24 | 0.0 | — | — | 0 A | 12 P | .42 | |
| 23 | 56.5 | .468 | 97.0 | E.S.E. | 14 | 0.0 | — | — | 0 A | 12 P | 1.45 | |
| 24 | 54.5 | .450 | 94.0 | N.N.E. | 49 | 0.0 | — | 4 P | 0 A | 12 P | .85 | |
| 25 | 49.0 | .512 | 68.0 | N.W. | 166 | 3.5 | 26 | — | 0 A | 2 A | .02 | |
| 26 | 41.5 | .432 | 62.0 | N.N.W. | 81 | 0.0 | — | — | | | | |
| 27 | 48.0 | .370 | 90.5 | N.N.W. | 31 | .05 | 10 | 8 A | 11 A | 6 P | .17 | |
| 28 | 47.0 | .366 | 88.5 | N. | 73 | 0.0 | — | — | 11 A | 12 P | 1.34 | |
| 29 | 48.0 | .463 | 74.0 | N.W. | 216 | 5.5 | 33 | 1 P | 11:30A | 12:30P | .01 | |
| 30 | 47.0 | .501 | 64.0 | W.N.W. | 198 | 0.5 | 10 | 8 A | | | | |
| 31 | 51.0 | .564 | 66.5 | N.N.W. | 91 | 0.5 | 10 | 1 P | | | | |

**Rain or meltedsnow at base of tower. *Included in following day.

## REMARKS

The weather during May was normal in most of its features, although variations were quite pronounced at different periods of the month. The first week was the warmest part of the month, while from the 8th to the 23d the temperature was considerably below the mean for the month. Killing frosts were noted on the mornings of the 11th and 12th, and a rather heavy frost on the morning of the 15th. The amount of damage done was considerable, but varied greatly in sections close to one another. The last decade of the month was marked by two very heavy rain storms, which made nearly the whole of the precipitation record.

The mean barometer was considerably higher than the normal for May ; the maximum and minimum records, as well as the range of pressure, showed practically no departure from normal values.

The total wind movement was about 80 per cent of the average amount for May, and no gales were noted. The amount of wind from the Northwest quadrant was about one-half the total.

The mean temperature was about one and one-half degrees below the normal, and the range slightly greater than usual. The maximum record was about two degrees higher than the usual value, and occurred so early in the month that it was more noticeable than it otherwise would have been. The minimum record was more than a week later than the maximum, and was preceded by the coldest day of the month. The low relative humidity which prevailed during the lowest temperatures of the month tended to minimize the damage from freezing.

The mean dew point was rather low, and the relative humidity for the month considerably higher than the normal.

The total precipitation was about one-third more than the normal, and but little of it occurred prior to the heavy rains noted above. Only two light thunder storms were noted.

The amount of sunshine was practically normal. The month closed with the growing season somewhat behind the normal conditions for the last of May.

J. E. OSTRANDER, Meteorologist.

H. W. ANGIER, Observer.

BULLETIN No. 294. JUNE, 1913

# Meteorological Observations
AT THE
# MASSACHUSETTS
# AGRICULTURAL EXPERIMENT
# STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.
*Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.*
*Height of Wind Instruments 72 ft.*

---

## MONTHLY SUMMARY.

### **Pressure.** In inches.

| | |
|---|---|
| Maximum reduced to freezing, | 30.14, 10th, 9 A. |
| Minimum reduced to freezing, | 29.34, 2d, 3 A. |
| Reduced† maximum reading, | 30.43, 10th, 9 A. |
| Reduced† minimum reading, | 29.63, 2d, 3 A. |
| Mean semi-daily reduced, | 29.996 |
| Monthly range, | 0.80 |

### ***Air Temperature.** In Degrees Fahr.

| | |
|---|---|
| Highest, | 92.0, 16th, 3:30 P. |
| Lowest, | 37.0, 10th, 5 A. |
| Mean hourly, | 66.4 |
| Mean of means of max. and min., | 66.0 |
| Mean sensible (wet bulb), | 59.4 |
| Monthly range, | 55.0 |
| Highest mean daily, | 77.2, 16th |
| Lowest mean daily, | 52.3, 9th |
| Mean maximum, | 80.0 |
| Mean minimum, | 51.9 |
| Mean daily range, | 28.1 |
| Greatest daily range, | 37.5, 29th |
| Least daily range, | 12.5, 20th |

### **Humidity.**

| | |
|---|---|
| Mean dew point, | 54.6 |
| Mean force of vapor, | .644 |
| Mean relative humidity, | 68.4 |

### **Precipitation.** In inches.

| | |
|---|---|
| Total precipitation, | .90 |
| Number of days on which .01 inch or more rain fell, | 6 |

### **Wind.**

| | |
|---|---|
| Total movement, | 3746m. |
| Greatest daily movement, | 227m., 6th |
| Least daily movement, | 41m., 21st |
| Mean daily movement, | 125 m |
| Mean hourly velocity, | 5.2 m |

Maximum pressure per square foot, 4.5 lbs.= 30m. per hour, 3d, 11 A., S.S.W.

Maximum velocity for 5 minutes, 24 m. per hour, 3d, 1 P., S.S.W.

Prevailing Direction, West Northwest.

### Summary.

| | |
|---|---|
| North Northwest | 20 per cent. |
| Northwest | 10 " " |
| West | 13 " " |
| West Southwest | 10 " " |
| South | 13 " " |
| Other directions | 34 " " |

### **Weather.**

| | |
|---|---|
| Mean cloudiness observed, | 35 per cent. |
| Total cloudiness recorded by the Sun Thermometer, | 145 hrs.=32 per cent. |
| Number of clear days, | 9 |
| Number of fair days, | 19 |
| Number of cloudy days, | 2 |

### **Bright Sunshine.**

Number of hours recorded, 312 hrs=68%.

**Rain**, 2d, 4th, 7th, 16th, 19th, 20th, 21st.

**Thunder and Lightning**, 7th.

**Gales**, 35 or more miles per hour: None.

---

* Temperature in ground shelter.
Reduced to freezing and sea-level.

# DAILY SUMMARY.

| Day. | Barometer Reduced to Sea Level. | | | Temperature. Ground Shelter. | | | | | | | No. of Hours Bright Sunshine. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Maximun. | Minimum. | Mean. Semi-daily. | Maximum | Time. | Minimum. | Time. | Mean of Max. and Min. | Mean Hourly Draper. | Mean Sensible Wet Bulb. | |
| 1 | 29.98 | 29.68 | 29.849 | 81.5 | 3 P | 44.5 | 5 A | 63.0 | 65.3 | 58.5 | 11.3 |
| 2 | 30.01 | 29.63 | 29.879 | 76.0 | 5:30 P | 52.0 | 12 P | 64.0 | 65.5 | 57.0 | 11.3 |
| 3 | 30.01 | 29.79 | 29.889 | 78.0 | 3 P | 43.5 | 5:30 A | 60.7 | 63.2 | 56.3 | 11.2 |
| 4 | 30.04 | 29.80 | 29.932 | 80.0 | 3 P | 56.5 | 12 P | 68.3 | 66.6 | 60.3 | 7.8 |
| 5 | 30.22 | 30.04 | 30.173 | 79.0 | 4 P | 48.0 | 5 A | 63.5 | 64.7 | 59.5 | 12.3 |
| 6 | 30.21 | 29.86 | 30.086 | 77.0 | 1:30 P | 53.0 | 5 A | 65.0 | 64.9 | 58.5 | 9.7 |
| 7 | 30.05 | 29.72 | 29.826 | 85.0 | 1 P | 53.5 | 12 P | 69.3 | 67.0 | 61.0 | 6.1 |
| 8 | 30.21 | 30.05 | 30.129 | 65.0 | 3 P | 48.0 | 5 A | 56.5 | 55.8 | 49.3 | 9.9 |
| 9 | 30.35 | 30.21 | 30.285 | 61.5 | 1 P | 41.5 | 5 A | 51.5 | 52.3 | 46.0 | 10.4 |
| 10 | 30.43 | 30.24 | 30.343 | 72.5 | 4 P | 37.0 | 5 A | 54.7 | 57.1 | 53.3 | 12.7 |
| 11 | 30.24 | 29.93 | 30.083 | 79.0 | 3 P | 44.0 | 4:30 A | 61.5 | 65.5 | 55.7 | 13.0 |
| 12 | 30.09 | 29.93 | 30.013 | 82.0 | 1 P | 48.5 | 5:30 A | 65.2 | 63.8 | 55.7 | 12.1 |
| 13 | 30.08 | 29.80 | 29.945 | 81.0 | 4 P | 46.0 | 5:30 A | 63.5 | 63.0 | 56.7 | 11.6 |
| 14 | 29.99 | 29.80 | 29.845 | 87.0 | 2:30 P | 55.5 | 5:30 A | 71.2 | 70.2 | 61.5 | 12.6 |
| 15 | 30.10 | 29.94 | 30.035 | 83.0 | 2:30 P | 49.0 | 5 A | 66.0 | 67.2 | 59.7 | 12.0 |
| 16 | 29.94 | 29.75 | 29.800 | 92.0 | 3:30 P | 62.5 | 4 A | 77.3 | 77.2 | 68.3 | 12.5 |
| 17 | 30.05 | 29.76 | 29.952 | 83.5 | 3 P | 58.0 | 12 P | 70.7 | 72.3 | 62.7 | 10.0 |
| 18 | 30.24 | 30.05 | 30.207 | 78.0 | 4:30 P | 45.5 | 5 A | 61.7 | 62.9 | 55.5 | 13.0 |
| 19 | 30.22 | 30.04 | 30.154 | 74.5 | 1:30 P | 46.5 | 5 A | 60.5 | 59.8 | 54.7 | 7.5 |
| 20 | 30.04 | 29.74 | 29.879 | 67.5 | 6 P | 55.0 | 0 A | 61.3 | 62.7 | 61.5 | 0.3 |
| 21 | 29.80 | 29.72 | 29.773 | 84.0 | 4:30 P | 65.0 | 3 A | 74.5 | 72.5 | 65.5 | 9.0 |
| 22 | 30.01 | 29.80 | 29.924 | 81.5 | 4 P | 59.0 | 5:30 A | 70.3 | 70.3 | 60.7 | 12.5 |
| 23 | 30.06 | 29.96 | 30.022 | 84.0 | 4 P | 51.0 | 5 A | 67.5 | 69.1 | 61.3 | 13.0 |
| 24 | 30.01 | 29.90 | 29.943 | 85.5 | 3 P | 56.5 | 5:30 A | 71.0 | 71.8 | 64.0 | 12.0 |
| 25 | 30.15 | 29.95 | 30.090 | 73.5 | 9 A | 59.5 | 5 A | 66.5 | 66.0 | 62.3 | 9.2 |
| 26 | 30.18 | 30.04 | 30.124 | 74.5 | 4 P | 56.0 | 5 A | 65.3 | 63.3 | 60.5 | 5.0 |
| 27 | 30.04 | 29.78 | 29.866 | 91.0 | 3 P | 64.0 | 0 A | 77.5 | 76.0 | 71.7 | 8.7 |
| 28 | 29.95 | 29.77 | 29.887 | 87.0 | 4:30 P | 61.0 | 12 P | 74.0 | 75.0 | 59.2 | 11.0 |
| 29 | 30.03 | 29.95 | 30.007 | 86.0 | 3 P | 48.5 | 5 A | 67.3 | 70.0 | 58.5 | 12.0 |
| 30 | 30.06 | 29.84 | 29.955 | 90.5 | 3:30 P | 49.5 | 5:30 A | 70.0 | 71.0 | 66.7 | 12.5 |

# DAILY SUMMARY.

| Day. | Humidity. | | | Wind. | | | | | Precipitation. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Mean Dew Point. | Mean Force vapor. | Mean Relative Humidity. | Prevailing Direction. | Total Movement in Miles. | Maximum Pressure Per Square Ft | Miles per Hour. | Time. | Beginning. | Ending. | Total in Inches. Rain.** | Total in Inches. Snow. |
| 1 | 53.0 | .626 | 66.0 | W. | 191 | 4 0 | 28 | 6 P | | | | |
| 2 | 52.0 | .600 | 64.0 | W. | 224 | 3.5 | 26 | 8 A | 1 A | 3 A | .03 | |
| 3 | 50 5 | .580 | 64.5 | W.S.W. | 199 | 4.5 | 30 | 11 A | | | | |
| 4 | 57.5 | .621 | 75.0 | E.S.E. | 98 | 0.0 | — | — | 1 A | 4 A | .08 | |
| 5 | 55.5 | .628 | 70 0 | N.N.W. | 70 | 0.0 | — | — | | | | |
| 6 | 55.0 | .586 | 75.5 | S. | 227 | 3.0 | 24 | 2 P | | | | |
| 7 | 58.5 | .634 | 76.5 | N.N.W. | 170 | 2.5 | 22 | 7 P | 2 P | 4 P | .24 | |
| 8 | 43.0 | .440 | 64.0 | N. | 181 | 0.0 | — | — | | | | |
| 9 | 38.0 | .408 | 57.0 | N.N.W. | 171 | 1.5 | 17 | 9 A | | | | |
| 10 | 49.5 | .495 | 71.0 | N.N.W. | 69 | 0 0 | — | — | | | | |
| 11 | 48.0 | .631 | 52.5 | W. | 141 | 1.0 | 14 | 4 P | | | | |
| 12 | 51.0 | .569 | 66.0 | E. | 94 | 4.0 | 28 | 2 P | | | | |
| 13 | 52.0 | .558 | 71.0 | S.S.E. | 110 | 1.5 | 17 | 3 P | | | | |
| 14 | 57.0 | .694 | 67.5 | W.N.W. | 98 | 0.0 | — | — | | | | |
| 15 | 54.5 | .652 | 66.0 | W.S.W. | 130 | 0.5 | 10 | 5 P | | | | |
| 16 | 64.5 | .877 | 70.5 | W. | 208 | .05 | 10 | 4 P | 11 P | | T | |
| 17 | 56.5 | .785 | 59.5 | N.W. | 167 | 2.5 | 22 | 9 P | | | | |
| 18 | 50.0 | .575 | 62.0 | N.W. | 105 | 0.5 | 10 | 9 A | | | | |
| 19 | 51.0 | .505 | 75.0 | W.S.W. | 85 | 0.0 | — | — | 2:30 P | 12 P | .47 | |
| 20 | 60.5 | .587 | 89.5 | S. | 48 | 0.0 | — | — | 9 A | 12 P | .06 | |
| 21 | 62.5 | .756 | 76.0 | N.E. | 41 | 0.0 | — | — | 0 A | 8 A | .02 | |
| 22 | 55 0 | .722 | 60.0 | N.W. | 94 | 0.0 | — | — | | | | |
| 23 | 56.0 | .719 | 63.0 | N.N.W. | 46 | 0.0 | — | — | | | | |
| 24 | 60.5 | .738 | 72.0 | S. | 100 | 0.0 | — | — | | | | |
| 25 | 59.5 | .678 | 77.0 | E.S.E. | 113 | 0 0 | — | — | | | | |
| 26 | 59.0 | .564 | 90.5 | S. | 78 | 0 0 | — | — | | | | |
| 27 | 70.5 | .889 | 83.5 | S.W. | 136 | 0.0 | — | — | | | | |
| 28 | 50.5 | .757 | 50.0 | N.N.W. | 182 | 3 5 | 26 | 7 A | | | | |
| 29 | 49.5 | .742 | 48.5 | N. | 56 | 0.0 | — | — | | | | |
| 30 | 57.5 | .920 | 67.0 | S.S.E. | 114 | 1.0 | 14 | 7 P | | | | |

**Rain or meltedsnow at base of tower. *Included in following day.

## REMARKS

The weather during the month resembled that of June, last year, in many respects. An unusually small precipitation, low relative humidity and large amount of sunshine, were all much the same as a year ago. The last third of the month was practically without rain. The last half of the month was considerably warmer than the first half.

A comparison of the records for the month of the several weather elements with the normal values shows the following as the more important features: The mean barometer was high for the time of year and the range more than the average value. Fluctuations in pressure were generally small and unimportant. While the total wind movement was slightly greater than the normal no gales were noted and no especially large daily wind movement recorded. Much of the wind was from the northwest quadrant.

The mean temperature was slightly greater than the normal while the maximum record was about the average value for this feature. The maximum was about two degrees below the normal giving a slightly greater range than usual. On the 10th the minimum record of 37 degrees was very close to the frost line but no frost was noted at the station.

The mean dew point and relative humidity were both rather low, owing to the dry conditions prevailing.

The total precipitation was practically one-fourth the normal and more than one-half of it occurred on a single date. Only one thunder shower was noted. Vegetation was much in need of rain at the close of the month. The amount of sunshine was much greater than the normal and but two cloudy days were noted.

J. E. OSTRANDER, Meteorologist.

E. K. DEXTER, Observer.

BULLETIN No. 295. JULY, 1913

# Meteorological Observations
AT THE
# MASSACHUSETTS
# AGRICULTURAL EXPERIMENT
# STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.
*Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.*
*Height of Wind Instruments 72 ft.*

## MONTHLY SUMMARY.

### **Pressure.** In inches.

| | |
|---|---|
| Maximum reduced to freezing, | 29.90, 31st, 12 P. |
| Minimum reduced to freezing, | 29.26, 6th, 2 P. |
| Reduced† maximum reading, | 30.19, 31st, 12 P. |
| Reduced† minimum reading, | 29.54, 6th, 2 P. |
| Mean semi-daily reduced, | 29.941 |
| Monthly range, | 0.65 |

### ***Air Temperature.** In Degrees Fahr.

| | |
|---|---|
| Highest, | 100.0, 1st, 3 P. |
| Lowest, | 41.0, 12th, 5:30 A. |
| Mean hourly, | 71.4 |
| Mean of means of max. and min., | 71.6 |
| Mean sensible (wet bulb), | 63.5 |
| Monthly range, | 59.0 |
| Highest mean daily, | 81.8, 1st |
| Lowest mean daily, | 61.8, 7th |
| Mean maximum, | 85.4 |
| Mean minimum, | 57.7 |
| Mean daily range, | 27.7 |
| Greatest daily range, | 45.0, 12th |
| Least daily range, | 10.5, 24th |

### **Humidity.**

| | |
|---|---|
| Mean dew point, | 59.8 |
| Mean force of vapor, | .754 |
| Mean relative humidity, | 70.5 |

### **Precipitation.** In inches.

| | |
|---|---|
| Total precipitation, | 1.59 |
| Number of days on which .01 inch or more rain fell, | 9 |

### **Wind.**

| | |
|---|---|
| Total movement, | 4315m. |
| Greatest daily movement, | 324m., 10th |
| Least daily movement, | 46m., 20th |
| Mean daily movement, | 139 m |
| Mean hourly velocity, | 5.8 m |

Maximum pressure per square foot, 2.7 lbs.= 73m. per hour, 23d, 5 P., S.S.W.
Maximum velocity for 5 minutes, 27m. per hour, 23d, 4P., S.S.W.
Prevailing Direction, Southwest.

### Summary.

| | |
|---|---|
| South | 29 per cent. |
| Northwest | 13 " " |
| North Northwest | 10 " " |
| South Southwest | 10 " " |
| South Southeast | 10 " " |
| Other directions | 28 " " |

### **Weather.**

| | |
|---|---|
| Mean cloudiness observed, | 39 per cent. |
| Total cloudiness recorded by the Sun Thermometer, | 138 hrs.=30 per cent. |
| Number of clear days, | 11 |
| Number of fair days, | 17 |
| Number of cloudy days, | 3 |

### **Bright Sunshine.**

Number of hours recorded, 324 hrs=70%.

**Rain**, 2d, 8th, 10th, 12th, 13th, 18th, 20th, 21st, 23d, 24th, 28th, 29th.

**Thunder and Lightning**, 8th, 13th, 18th, 21st, 23d, 28th, 29th, 30th.

**Gales**, 35 or more miles per hour: 73m, 23d, S.S.W.

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*Temperature in ground shelter.

†Reduced to freezing and sea-level.

# DAILY SUMMARY.

| Day. | Barometer Reduced to Sea Level. |  |  | Temperature. Ground Shelter. |  |  |  |  |  |  | No. Hours of Bright Sunshine |
|---|---|---|---|---|---|---|---|---|---|---|---|
|  | Maximun. | Minimum. | Mean. Semi-daily. | Maximum | Time. | Minimum. | Time. | Mean of Max. and Min. | Mean Hourly Draper. | Mean Sensible Wet Bulb. |  |
| 1 | 29.88 | 29.71 | 29 789 | 100.0 | 3 P | 64.5 | 5 A | 82 3 | 81.8 | 73.2 | 12.2 |
| 2 | 30.02 | 29.79 | 29.910 | 88.5 | 2:30 P | 70.5 | 5 A | 79.5 | 76.4 | 69.2 | 6.2 |
| 3 | 30.18 | 30.02 | 30.133 | 91.0 | 4:30 P | 59.0 | 5 A | 75.0 | 75.1 | 68.7 | 12.7 |
| 4 | 30.18 | 29 98 | 30.075 | 95.0 | 3 P | 61.5 | 4:30 A | 78.3 | 78 0 | 69 5 | 12.7 |
| 5 | 30.01 | 29.73 | 29.865 | 95 0 | 2 P | 65.5 | 5 A | 80.3 | 79.8 | 71.7 | 9.5 |
| 6 | 29.73 | 29.54 | 29.648 | 91.5 | 1 P | 64 5 | 12 P | 78.0 | 78 0 | 67.3 | 11.0 |
| 7 | 29.86 | 29.64 | 29 775 | 70.0 | 3:30 P | 54.5 | 5 A | 62.3 | 61.8 | 54.7 | 8.2 |
| 8 | 30.04 | 29.86 | 29.988 | 82.0 | 2:30 P | 45.5 | 5:30 A | 63.7 | 63.7 | 56.5 | 12.5 |
| 9 | 30.04 | 29.80 | 29 969 | 82.0 | 12 M | 48.0 | 5 A | 65.0 | 67 5 | 47.3 | 11.7 |
| 10 | 29.87 | 29.71 | 29.786 | 79.0 | 2:30 P | 63 0 | 12 P | 71.0 | 70.6 | 62.0 | 11.2 |
| 11 | 29.97 | 29.86 | 29.923 | 81.0 | 3:30 P | 51.5 | 5:30 A | 66.5 | 66.3 | 58.3 | 12.0 |
| 12 | 29.98 | 29.66 | 29.819 | 86 0 | 2 P | 41.0 | 5:30 A | 63.5 | 67.0 | 63 0 | 10.3 |
| 13 | 29.76 | 29.64 | 29 712 | 87.0 | 4 P | 62.5 | 2 A | 74.7 | 75.3 | 65.7 | 12.2 |
| 14 | 29.99 | 29 68 | 29.882 | 75.5 | 4:30 P | 60 0 | 5:30 A | 67.7 | 67.0 | 58.0 | 12.7 |
| 15 | 30 06 | 29.97 | 30.023 | 81 5 | 3 P | 53 5 | 4:30 A | 67.5 | 68.7 | 60.5 | 13.0 |
| 16 | 30.09 | 30.02 | 30.077 | 84.0 | 5 P | 52.5 | 5 A | 68.3 | 69.5 | 62.5 | 13.5 |
| 17 | 30 06 | 29 89 | 29.976 | 86.0 | 3:30 P | 50 5 | 5:30 A | 68 3 | 69 8 | 62.0 | 11.5 |
| 18 | 29.91 | 29.69 | 29 803 | 78.0 | 6 P | 62 0 | 9 A | 70.0 | 67.4 | 63.3 | 4.5 |
| 19 | 29.76 | 29.70 | 29.755 | 85 5 | 5 P | 56.5 | 5:30 A | 71.0 | 72.0 | 66.3 | 11.7 |
| 20 | 29.84 | 29.74 | 29 823 | 87.0 | 2 P | 57.0 | 6 A | 72.0 | 67.8 | 63.3 | 8.5 |
| 21 | 30.03 | 29.83 | 29.934 | 82.5 | 4:30 P | 53 0 | 5 A | 67.7 | 66 6 | 61.5 | 11.3 |
| 22 | 30.13 | 30.03 | 30.099 | 87.5 | 4 P | 52.0 | 5:30 A | 69 7 | 70.8 | 61.3 | 12.7 |
| 23 | 30.12 | 29.99 | 30.055 | 87.5 | 3:30 P | 63 0 | 5 A | 75.3 | 74.3 | 65.5 | 10.0 |
| 24 | 30.00 | 29.82 | 29 867 | 77.5 | 11 A | 67 0 | 12 P | 72.3 | 71.4 | 66.7 | 1.5 |
| 25 | 30.12 | 29.82 | 29.995 | 79.0 | 4 P | 54.0 | 12 P | 66.5 | 67.8 | 57.5 | 12.7 |
| 26 | 30.19 | 30 05 | 30.154 | 85.0 | 4 P | 44.0 | 5 A | 64 5 | 67 0 | 56.7 | 10.5 |
| 27 | 30.15 | 30.02 | 30.117 | 89.5 | 3 P | 53 5 | 5:30 A | 71.5 | 72.0 | 63.0 | 10.2 |
| 28 | 30.10 | 30.01 | 30.076 | 80.5 | 0:30 P | 62.0 | 5 A | 71.3 | 70.3 | 68.5 | 5.0 |
| 29 | 30.09 | 29.92 | 30.013 | 93.5 | 4:30 P | 70.5 | 5 A | 82.0 | 78.8 | 73.5 | 7.7 |
| 30 | 30.07 | 29.91 | 29.985 | 90 5 | 5 P | 67.5 | 6 A | 79.0 | 78.8 | 69.7 | 11.3 |
| 31 | 30.19 | 30.07 | 30.149 | 88.0 | 4 P | 60.0 | 5:30 A | 74.0 | 73.4 | 63.0 | 12.8 |

# DAILY SUMMARY.

| Day. | Humidity. | | | Wind. | | | | | Precipitation. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Total in Inches. | |
| | Mean Dew Point. | Mean Force vapor. | Mean Relative Humidity. | Prevailing Direction. | Total Movement in Miles. | Maximum Pressure Per Square Ft | Miles per Hour. | Time. | Beginning. | Ending. | Rain.** | Snow. |
| 1 | 69.5 | 1.051 | 69.5 | S. | 198 | 0.0 | — | — | | | | |
| 2 | 65.5 | .895 | 72.5 | S. | 80 | 0.0 | — | — | 5 P | | T | |
| 3 | 65.5 | .839 | 76.5 | S. | 59 | 0.0 | — | — | | | | |
| 4 | 66.0 | .887 | 74.0 | S. | 149 | 0.0 | — | — | | | | |
| 5 | 69.0 | .968 | 74.0 | S. | 133 | 0.0 | — | — | | | | |
| 6 | 63.5 | .820 | 73.0 | N.W. | 182 | 2.0 | 20 | 4 P | | | | |
| 7 | 49.5 | .551 | 65.0 | W.N.W. | 243 | 2.0 | 20 | 2 A | | | | |
| 8 | 51.0 | .567 | 66.5 | N.W. | 88 | 0.0 | — | — | 3:30 P | | T | |
| 9 | 59.0 | .655 | 78.5 | S.S.E. | 192 | 4.0 | 28 | 12 M | | | | |
| 10 | 58.0 | .686 | 72.0 | S. | 324 | 3.0 | 24 | 2 P | 5 A | 6:30 A | .03 | |
| 11 | 50.5 | .695 | 53.5 | N.W. | 162 | 1.0 | 14 | 9 A | | | | |
| 12 | 59.0 | .706 | 72.0 | S. | 169 | 3.0 | 24 | 3 P | 8 P | 12 P | .30 | |
| 13 | 61.0 | .819 | 67.5 | S.S.W. | 266 | 5.5 | 33 | 2 P | 0 A | 12 P | .14 | |
| 14 | 52.0 | .644 | 60.5 | W.N.W. | 292 | 4.5 | 30 | 5 A | | | | |
| 15 | 55.0 | .722 | 59.5 | N.W. | 112 | 0.5 | 10 | 3 P | | | | |
| 16 | 57.0 | .776 | 60.5 | N.N.W. | 123 | 0.5 | 10 | 10 A | | | | |
| 17 | 58.5 | .693 | 71.5 | N.N.W. | 69 | 0.0 | — | — | | | | |
| 18 | 61.5 | .623 | 90.0 | S. | 70 | 0.0 | — | — | 6 A | 9 P | .14 | |
| 19 | 63.0 | .775 | 75.5 | N. | 74 | 0.0 | — | — | | | | |
| 20 | 60.5 | .668 | 80.5 | W. | 46 | 3.5 | 26 | 4 P | 3 P | 8:30 P | .06 | |
| 21 | 57.0 | .674 | 71.0 | N.E. | 80 | 1.0 | 14 | 11 A | 11 A | 4 P | .01 | |
| 22 | 55.5 | .723 | 63.5 | W.S.W. | 69 | 0.0 | — | — | | | | |
| 23 | 60.5 | .822 | 65.5 | S.S.W. | 241 | 27.0 | 73 | 5 P | 11:30 P | | T | |
| 24 | 64.5 | .752 | 81.5 | S.S.W. | 161 | 0.0 | — | — | 11 A | 11 P | .03 | |
| 25 | 51.0 | .642 | 59.0 | N.N.W. | 160 | 1.5 | 17 | 4 P | | | | |
| 26 | 49.5 | .637 | 57.5 | S.W. | 113 | 0.0 | — | — | | | | |
| 27 | 59.0 | .715 | 72.5 | S. | 134 | 0.0 | — | — | | | | |
| 28 | 67.0 | .766 | 86.0 | S.S.E. | 106 | 0.0 | — | — | 1 P | 3 P | .86 | |
| 29 | 72.0 | .939 | 84.5 | S.S.E. | 54 | 0.0 | — | — | 1 A | 2 A | .02 | |
| 30 | 67.0 | .879 | 75.0 | N.E. | 87 | 0.0 | — | — | | | | |
| 31 | 57.0 | .805 | 58.5 | N.N.E. | 79 | 0.0 | — | — | | | | |

**Rain or meltedsnow at base of tower. *Included in following day.

## REMARKS

The weather during the month was unusually dry and clear. Prior to the heavy shower of the 28th, all the rainstorms were so light that they were of little benefit to vegetation. Following the unusually small rainfall of June, especially the entire absence of rain the latter part of that month, with less than one half an inch the first half of July, the ground near the surface was thoroughly dried out. While the shower of the 28th did much good, a great deal more rain is needed soon to mature growing crops.

High temperatures and much sunshine were also important features of the month.

Comparing the month's records with the normals for this station the following features are noted: The mean barometer was rather low, while the range was about the usual amount. Changes in pressure were generally slow and of small amount. The total wind movement was about 25 per cent more than the July normal and a comparatively large amount was from the south directions.

The mean temperature was about a degree and one-half higher than the normal, and the maximum of 100 degrees, on the 1st, has been exceeded but a few times here. The first and last weeks were the warmest parts of the month, while the coolest period was from the 7th to the 22d.

The total precipitation was about one-third the normal amount, and more than one-half the total occurred during a heavy thunder shower on the 28th. Distant thunder or lightning was noted on many more dates than usual.

The mean dew point and relative humidity were both considerably lower than the normals for these features.

The number of hours of bright sunshine recorded was one of the largest records ever taken at this station: the number of cloudy days noted was correspondingly small.

J. E. OSTRANDER, Meteorologist

E. K. DEXTER, Observer.

BULLETIN No. 296. AUGUST, 1913

# Meteorological Observations
AT THE
# MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.
*Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.*
*Height of Wind Instruments 72 ft.*

## MONTHLY SUMMARY.

### **Pressure.** In inches.

| | |
|---|---|
| Maximum reduced to freezing, | 30.12, 20th, 8 A. |
| Minimum reduced to freezing, | 29.40, 29th, 11 P. |
| Reduced† maximum reading, | 30.41, 20th, 8 A., 21st, 7 A. |
| Reduced† minimum reading, | 29.69, 29th, 11 P. |
| Mean semi-daily reduced, | 30.035 |
| Monthly range, | 0.72 |

### ***Air Temperature.** In Degrees Fahr.

| | |
|---|---|
| Highest, | 97.0, 17th, 3 P. |
| Lowest, | 41.0, 26th, 6 A. |
| Mean hourly, | 69.5 |
| Mean of means of max. and min., | 69.9 |
| Mean sensible (wet bulb), | 62.3 |
| Monthly range, | 56.0 |
| Highest mean daily, | 78.4, 18th |
| Lowest mean daily, | 61.8, 25th |
| Mean maximum, | 83.5 |
| Mean minimum, | 56.4 |
| Mean daily range, | 27.1 |
| Greatest daily range, | 43.0, 26th |
| Least daily range, | 11.5, 29th |

### **Humidity.**

| | |
|---|---|
| Mean dew point, | 58.6 |
| Mean force of vapor, | .688 |
| Mean relative humidity, | 74.2 |

### **Precipitation.** In inches.

| | |
|---|---|
| Total precipitation, | 2.26 |
| Number of days on which .01 inch or more rain fell, | 10 |

### **Wind.**

| | |
|---|---|
| Total movement, | 3441m. |
| Greatest daily movement, | 254m., 22d |
| Least daily movement, | 27m., 3d, 31st |
| Mean daily movement, | 111 m |
| Mean hourly velocity, | 4.6 m |
| Maximum pressure per square foot, | 4.5 lbs.= 39m. per hour, 22d, 4 P., S. |
| Maximum velocity for 5 minutes, | 24m. per hour, 22d, 2P., S. |
| Prevailing Direction, | Southwest. |

### Summary.

| | |
|---|---|
| South | 19 per cent. |
| North Northeast | 10 " " |
| West Northwest | 13 " " |
| South Southwest | 19 " " |
| West Southwest | 10 " " |
| Other directions | 29 " " |

### **Weather.**

| | |
|---|---|
| Mean cloudiness observed, | 41 per cent. |
| Total cloudiness recorded by the Sun Thermometer, | 147 hrs.=34 per cent. |
| Number of clear days, | 13 |
| Number of fair days, | 13 |
| Number of cloudy days, | 5 |

### **Bright Sunshine.**

Number of hours recorded, . . 282 hrs=66%.

**Rain**, 2d, 4th, 6th, 7th, 10th, 13th, 14th, 17th, 22d, 23d, 27th, 29th, 30th.

**Thunder and Lightning**, 4th, 27th, 29th, 30th.

**Gales**, 35 or more miles per hour: None.

*Temperature in ground shelter.

†Reduced to freezing and sea-level.

# DAILY SUMMARY.

| Day. | Barometer Reduced to Sea Level. | | | Temperature. Ground Shelter. | | | | | | | No. Hours of Bright Sunshine |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Maximun. | Minimum. | Mean. Semi-daily. | Maximum | Time. | Minimum. | Time. | Mean of Max. and Min. | Mean Hourly Draper. | Mean Sensible Wet Bulb. | |
| 1 | 30.19 | 29.98 | 30.061 | 74.0 | 6:30 P | 60.0 | 2:30 A | 67.0 | 68.1 | 64.7 | 2.0 |
| 2 | 29.99 | 29.89 | 29.946 | 89.0 | 2 P | 64.0 | 12 P | 76.5 | 75.0 | 64.5 | 10.9 |
| 3 | 29.97 | 29.80 | 29.896 | 89.5 | 3 P | 55.5 | 5:30 A | 72.5 | 72.7 | 63.3 | 12.1 |
| 4 | 29.97 | 29.81 | 29.886 | 80.0 | 4 P | 59.0 | 12 P | 69.5 | 68.3 | 61.7 | 5.7 |
| 5 | 30.15 | 29.97 | 30.117 | 84.0 | 3:30 P | 49.5 | 5:30 A | 66.7 | 67.2 | 59.3 | 12.0 |
| 6 | 30.15 | 29.99 | 30.075 | 81.5 | 1 P | 58.0 | 5 A | 69.7 | 69.7 | 63.0 | 5.7 |
| 7 | 30.10 | 29.99 | 30.032 | 84.0 | 4:30 P | 63.0 | 5:30 A | 73.5 | 72.1 | 66.3 | 10.0 |
| 8 | 30.16 | 30.08 | 30.137 | 87.0 | 2:30 P | 54.0 | 5:30 A | 70.5 | 71.5 | 65.3 | 11.8 |
| 9 | 30.14 | 29.89 | 29.977 | 86.0 | 3 P | 65.5 | 4:30 A | 75.7 | 75.4 | 70.5 | 4.0 |
| 10 | 29.98 | 29.81 | 29.892 | 88.0 | 3:30 P | 63.0 | 12 P | 75.5 | 76.3 | 68.7 | 7.0 |
| 11 | 30.21 | 29.98 | 30.104 | 78.0 | 3 P | 50.5 | 6 A | 64.3 | 64.2 | 53.5 | 11.8 |
| 12 | 30.28 | 30.17 | 30.224 | 80.0 | 3:30 P | 44.5 | 6 A | 62.3 | 62.8 | 54.3 | 11.3 |
| 13 | 30.19 | 30.06 | 30.135 | 77.5 | 3 P | 54.0 | 6 A | 65.7 | 65.1 | 60.5 | 7.3 |
| 14 | 30.16 | 30.07 | 30.135 | 79.0 | 4:30 P | 53.5 | 5 A | 66.3 | 64.6 | 59.3 | 7.5 |
| 15 | 30.14 | 30.03 | 30.093 | 85.5 | 4 P | 55.0 | 6 A | 70.3 | 69.8 | 62.7 | 11.5 |
| 16 | 30.09 | 29.90 | 29.984 | 94.0 | 4 P | 57.0 | 6 A | 75.5 | 74.9 | 66.3 | 11.0 |
| 17 | 29.97 | 29.89 | 29.944 | 97.0 | 3 P | 62.5 | 6 A | 79.7 | 77.7 | 70.3 | 8.5 |
| 18 | 30.07 | 29.95 | 29.983 | 91.0 | 12 M | 68.5 | 6 A | 79.7 | 78.4 | 72.5 | 9.0 |
| 19 | 30.32 | 30.07 | 30.231 | 86.0 | 4 P | 57.0 | 12 P | 71.5 | 71.7 | 59.5 | 11.0 |
| 20 | 30.41 | 30.32 | 30.388 | 83.0 | 4:30 P | 49.5 | 6 A | 66.3 | 65.8 | 56.5 | 12.0 |
| 21 | 30.41 | 30.20 | 30.305 | 79.0 | 4 P | 47.0 | 6 A | 63.0 | 63.6 | 54.7 | 11.1 |
| 22 | 30.20 | 29.83 | 29.959 | 78.0 | 1:30 P | 50.5 | 5:30 A | 64.3 | 65.3 | 60.3 | 8.2 |
| 23 | 29.93 | 29.73 | 29.819 | 81.0 | 2 P | 61.0 | 12 P | 71.0 | 71.4 | 64.5 | 10.3 |
| 24 | 29.95 | 29.82 | 29.904 | 83.0 | 3 P | 53.0 | 6 A | 68.0 | 67.1 | 60.0 | 11.5 |
| 25 | 30.07 | 29.89 | 30.056 | 77.5 | 4 P | 50.5 | 6 A | 64.0 | 61.8 | 52.3 | 11.6 |
| 26 | 30.07 | 29.92 | 30.012 | 84.0 | 3 P | 41.0 | 6 A | 62.5 | 63.8 | 56.3 | 11.0 |
| 27 | 30.02 | 29.88 | 29.972 | 83.5 | 3 P | 65.0 | 12 P | 74.3 | 72.6 | 66.0 | 5.9 |
| 28 | 30.09 | 29.96 | 30.030 | 86.0 | 3:30 P | 54.5 | 6:30 A | 70.3 | 69.8 | 61.5 | 10.1 |
| 29 | 29.96 | 29.69 | 29.779 | 76.0 | 5:30 P | 64.5 | 8:30 A | 70.3 | 69.7 | 67.7 | 1.5 |
| 30 | 30.01 | 29.72 | 29.885 | 82.0 | 3 P | 62.5 | 12 P | 72.3 | 69.9 | 63.3 | 8.8 |
| 31 | 30.20 | 30.01 | 30.131 | 83.0 | 3:30 P | 54.0 | 6 A | 68.5 | 68.7 | 62.0 | 10.2 |

# DAILY SUMMARY.

| Day. | Humidity. | | | Wind. | | | | | Precipitation. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Mean Dew Point. | Mean Force vapor. | Mean Relative Humidity. | Prevailing Direction. | Total Movement in Miles. | Maximum Pressure Per Square Ft | Miles per Hour. | Time. | Beginning. | Ending. | Total in Inches. Rain.** | Total in Inches. Snow. |
| 1 | 63.5 | .690 | 84.0 | S. | 105 | 0.5 | 10 | 1:30P | | | | |
| 2 | 60.5 | .760 | 70.0 | W.N.W. | 78 | 0.0 | — | — | 1 A | 2 A | T | |
| 3 | 60.0 | .701 | 74.5 | W.N.W. | 27 | 0.0 | — | — | | | | |
| 4 | 59.0 | .632 | 81.5 | N.N.E. | 85 | 0.0 | — | — | 7 A | 11 A | .21 | |
| 5 | 54.5 | .653 | 66.0 | N.N.E. | 62 | 0.0 | — | — | | | | |
| 6 | 59.5 | .683 | 77.0 | S. | 179 | 1.5 | 18 | 4 P | 2 P | 12 P | .03 | |
| 7 | 64.0 | .750 | 80.5 | N. | 66 | 0.0 | — | — | 0 A | 2 A | .01 | |
| 8 | 62.0 | .731 | 72.0 | S. | 108 | 0.0 | — | — | | | | |
| 9 | 68.0 | .872 | 81.5 | S.S.W. | 195 | 0.0 | — | — | | | | |
| 10 | 66.5 | .830 | 79.0 | W. | 108 | 4.0 | 28 | 5 P | 7:30 A | 8 P | .01 | |
| 11 | 45.0 | .582 | 51.5 | N.N.W. | 227 | 3.0 | 24 | 10 A | | | | |
| 12 | 48.5 | .645 | 64.0 | S.W. | 62 | 0.0 | — | — | | | | |
| 13 | 58.5 | .593 | 82.0 | S.S.W. | 117 | 2.0 | 20 | 4 P | 11 A | 6:30 P | .18 | |
| 14 | 56.0 | .594 | 77.5 | S.E. | 38 | 0.0 | — | — | 6 A | | T | |
| 15 | 59.5 | .688 | 74.0 | S.S.E. | 72 | 0.0 | — | — | | | | |
| 16 | 63.0 | .803 | 74.0 | S. | 60 | 0.0 | — | — | | | | |
| 17 | 68.5 | .844 | 82.0 | S. | 50 | 1.0 | 14 | 3 P | 4 P | | T | |
| 18 | 68.0 | .916 | 81.0 | E. | 60 | 1.5 | 17 | 1 P | | | | |
| 19 | 53.5 | .700 | 59.0 | N.N.E. | 143 | 0.5 | 10 | 6 P | | | | |
| 20 | 49.5 | .627 | 57.5 | S. | 60 | 0.0 | — | — | | | | |
| 21 | 49.0 | .549 | 64.5 | S.S.W. | 147 | 1.5 | 17 | 5 P | | | | |
| 22 | 56.5 | .634 | 73.5 | S.S.W. | 254 | 4.5 | 30 | 4 P | 7 P | 12 P | .24 | |
| 23 | 61.5 | .713 | 77.5 | W.N.W. | 247 | 0.5 | 10 | 12 M | 0 A | 5 A | .20 | |
| 24 | 55.5 | .643 | 69.0 | W.S.W. | 81 | 0.0 | — | — | | | | |
| 25 | 46.5 | .503 | 63.5 | N. | 94 | 1.5 | — | — | | | | |
| 26 | 53.0 | .555 | 77.5 | S.S.W. | 157 | 3.0 | 24 | 12 M | | | | |
| 27 | 64.0 | .717 | 84.5 | W.S.W. | 146 | 1.0 | 14 | 2 A | 1 A | 3:30 P | .01 | |
| 28 | 56.5 | .693 | 67.0 | W. | 58 | 0.0 | — | — | | | | |
| 29 | 67.0 | .718 | 94.0 | S.S.W. | 185 | 2.0 | 20 | 4 P | 4:30 A | 12 P | 1.20 | |
| 30 | 61.5 | .645 | 85.0 | W.S.W. | 143 | 0.0 | — | — | 0 A | 4 A | .17 | |
| 31 | 59.0 | .655 | 76.5 | W.N.W. | 27 | 0.0 | — | — | | | | |

**Rain or melted snow at base of tower.

*Included in following day.

## REMARKS

The weather during August was especially marked by the small precipitation and large amount of sunshine. The droughty conditions, which were noted in July, continued up to nearly the end of August before any heavy rain occurred. On the 29th, heavy showers, with unusually severe thunder and lightning, did much to relieve the drought and replenish the water supplies in this vicinity.

An analysis of the records of the several weather elements for the month and comparison with the normals for this station shows the following as the more important features: The mean barometer was practically normal while the maximum and minimum were both above the normals for these records. The total wind movement was slightly greater than usual and a large amount was from the southwest quadrant. No gales were recorded during the month.

The mean temperature was about two degrees higher than the normal and the maximum temperature was an unusually high record for August. The minimum temperature was a degree lower than usual giving a large range for the month.

The mean dew point and relative humidity were both lower than the normal and the amount of sultry weather for the time of year was small.

The total precipitation was practically two inches less than the normal and nearly two-thirds of the total fell during the storm of the 29th. During this storm, thunder and lightning was nearly incessant for more than an hour.

The amount of sunshine was much greater than usual and but few cloudy days were noted.

J. E. OSTRANDER, Meteorologist

E. K. DEXTER, Observer.

**BULLETIN No. 297. SEPTEMBER, 1913**

# Meteorological Observations

AT THE

# MASSACHUSETTS
# AGRICULTURAL EXPERIMENT
# STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.
*Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.*
*Height of Wind Instruments 72 ft.*

## MONTHLY SUMMARY.

### **Pressure.** In inches.

| | |
|---|---|
| Maximum reduced to freezing, | 30.28, 16th, 8 A. |
| Minimum reduced to freezing, | 29.46, 13th, 4 A. |
| Reduced† maximum reading, | 30.58, 16th, 8 A. |
| Reduced† minimum reading, | 29.75, 13th, 4 A. |
| Mean semi-daily reduced, | 30.134 |
| Monthly range, | 0.83 |

### ***Air Temperature.** In Degrees Fahr.

| | |
|---|---|
| Highest, | 87.5, 2d, 2:30 P. |
| Lowest, | 31.0, 15th, 6 A. |
| Mean hourly, | 59.7 |
| Mean of means of max. and min., | 60.0 |
| Mean sensible (wet bulb), | 54.2 |
| Monthly range, | 56.5 |
| Highest mean daily, | 73.8, 3d |
| Lowest mean daily, | 48.0, 15th |
| Mean maximum, | 71.7 |
| Mean minimum, | 48.3 |
| Mean daily range, | 23.4 |
| Greatest daily range, | 42.5, 16th |
| Least daily range, | 5.0, 19th |

### **Humidity.**

| | |
|---|---|
| Mean dew point, | 51.0 |
| Mean force of vapor, | .493 |
| Mean relative humidity, | 80.2 |

### **Precipitation.** In inches.

| | |
|---|---|
| Total precipitation, | 2.56 |
| Number of days on which .01 inch or more rain fell, | 11 |

*Temperature in ground shelter.
†Reduced to freezing and sea-level.

### **Wind.**

| | |
|---|---|
| Total movement, | 3220m. |
| Greatest daily movement, | 293m., 22d |
| Least daily movement, | 9m., 5th |
| Mean daily movement, | 107 m |
| Mean hourly velocity, | 4.5 m |

Maximum pressure per square foot, 6.5 lbs.= 36m. per hour, 22d, 5 A., S.
Maximum velocity for 5 minutes, 24m. per hour, 13th, 1P., W.N.W.
Prevailing Direction, Northwest.

### Summary.

| | |
|---|---|
| South | 27 per cent. |
| North | 17 " " |
| North Northeast | 10 " " |
| North Northwest | 10 " " |
| Other directions | 38 " " |

### **Weather.**

| | |
|---|---|
| Mean cloudiness observed, | 47 per cent. |
| Total cloudiness recorded by the Sun Thermometer, | 191 hrs.=51 per cent. |
| Number of clear days, | 8 |
| Number of fair days, | 10 |
| Number of cloudy days, | 12 |

### **Bright Sunshine.**

Number of hours recorded, . . 182 hrs=49%.

**Rain,** 2d, 4th, 5th, 7th, 8th, 13th, 17th, 18th, 19th, 20th, 21st, 22d.

**Thunder and Lightning,** none.

**Frosts,** 10th, 11th, 15th, 16th, 28th.

**Gales,** 35 or more miles per hour: 35m, 9th, N.; 36m, 22d, S.

# DAILY SUMMARY.

| Day. | Barometer Reduced to Sea Level. |  |  | Temperature. Ground Shelter. |  |  |  |  |  |  | No. Hours of Bright Sunshine |
|---|---|---|---|---|---|---|---|---|---|---|---|
|  | Maximun. | Minimum. | Mean. Semi-daily. | Maximum | Time. | Minimum. | Time. | Mean of Max. and Min. | Mean Hourly Draper. | Mean Sensible Wet Bulb. |  |
| 1 | 30.27 | 30.20 | 30.258 | 85 0 | 4 P | 60.0 | 6 A | 72.5 | 69.8 | 65.3 | 6.5 |
| 2 | 30.31 | 30.21 | 30.256 | 87.5 | 2:30 P | 66.0 | 8 A | 76.7 | 72.9 | 68 5 | 7.4 |
| 3 | 30.21 | 30.01 | 30.108 | 86.0 | 3:30 P | 63.5 | 5:30 A | 69.7 | 73.8 | 66.5 | 9.1 |
| 4 | 30.16 | 30.04 | 30.137 | 71.0 | 0 A | 57.5 | 4 P | 64 3 | 62.5 | 59 3 | 0.0 |
| 5 | 30.17 | 30.12 | 30.139 | 60.5 | 5 P | 54.5 | 12 P | 57.5 | 57.8 | 56.5 | 0.0 |
| 6 | 30.27 | 30.17 | 30.230 | 79.0 | 4 P | 50.0 | 3:30 A | 64.5 | 63.3 | 59.3 | 9.0 |
| 7 | 30.28 | 30.04 | 30.200 | 67.5 | 3 P | 57.0 | 5 A | 62.3 | 63.6 | 61.3 | 0.0 |
| 8 | 30.04 | 29.84 | 29.940 | 82 5 | 3 P | 59 0 | 12 P | 70.7 | 70.5 | 64.7 | 4.5 |
| 9 | 30.42 | 30.01 | 30.183 | 66.0 | 5 P | 43.0 | 12 P | 54 5 | 56.0 | 47.0 | 5.0 |
| 10 | 30.48 | 30.27 | 30.388 | 69.5 | 5 P | 38.5 | 6 A | 54 0 | 52.3 | 46.3 | 7.5 |
| 11 | 30.27 | 30 05 | 30.135 | 69.5 | 5 P | 35.5 | 7 A | 52.5 | 52 8 | 46.3 | 5 5 |
| 12 | 30.05 | 29.83 | 29.917 | 70.5 | 3:30 P | 46.0 | 4:30 A | 58.3 | 57.4 | 53.0 | 4.0 |
| 13 | 30.08 | 29.75 | 29.890 | 70.0 | 2 P | 48 0 | 12 P | 64.0 | 60.7 | 51.3 | 10.0 |
| 14 | 30 43 | 30.08 | 30.301 | 64.0 | 3:30 P | 38 0 | 6 A | 51.0 | 50.5 | 44 7 | 11.0 |
| 15 | 30.56 | 30.43 | 30.534 | 68.0 | 4 P | 31.0 | 6 A | 48.5 | 48.0 | 41.5 | 11.0 |
| 16 | 30.58 | 30.43 | 30.510 | 74.0 | 3 P | 31.5 | 6:30 A | 52.7 | 52.3 | 45 5 | 10.7 |
| 17 | 30.43 | 29.99 | 30.201 | 75.0 | 3:30 P | 47.0 | 3 A | 61.0 | 60.7 | 56.5 | 6.0 |
| 18 | 29.99 | 29.83 | 29.884 | 73.0 | 2:30 P | 59.0 | 12 P | 66 0 | 66 4 | 60.5 | 1.6 |
| 19 | 29 99 | 29 92 | 30.002 | 59.0 | 0 A | 54.0 | 12 P | 57.5 | 56.3 | 53.5 | 0.0 |
| 20 | 30 02 | 29.98 | 30.012 | 61 0 | 4 P | 53.5 | 3 A | 57.3 | 57.0 | 55.5 | 0 0 |
| 21 | 29 99 | 29.82 | 29 924 | 73.0 | 12 P | 57.0 | 5:30 A | 65.0 | 64.5 | 62.7 | 0.2 |
| 22 | 30.00 | 29.80 | 29 847 | 73.0 | 0 A | 57.0 | 12 P | 65 0 | 67.1 | 64.3 | 0.6 |
| 23 | 30.26 | 30.00 | 30.220 | 67.5 | 3:30 P | 46.0 | 6 A | 56 7 | 55.9 | 49.0 | 10.1 |
| 24 | 30.35 | 30.26 | 30.322 | 71.0 | 4 P | 39.5 | 6:30 A | 55.3 | 54.3 | 48.3 | 10.3 |
| 25 | 30.30 | 30.14 | 30.235 | 77.0 | 2:30 P | 40.5 | 5:30 A | 58.7 | 58.5 | 50.7 | 10.0 |
| 26 | 30.14 | 29.88 | 29.983 | 78.5 | 3:30 P | 48.0 | 7 A | 63.3 | 62.4 | 55.7 | 9.5 |
| 27 | 30.21 | 29.91 | 30.066 | 67.5 | 4 P | 45.0 | 12 P | 56.3 | 58.3 | 49.7 | 10.0 |
| 28 | 30.32 | 30.12 | 30.183 | 70.0 | 3 P | 33.5 | 6:30 A | 51.7 | 51.7 | 43.3 | 10.6 |
| 29 | 30.12 | 29.87 | 29 934 | 76.5 | 3:30 P | 46.5 | 7 A | 61.5 | 58.7 | 50 7 | 7 7 |
| 30 | 30.11 | 29.98 | 30.088 | 59 5 | 3 P | 45.0 | 6 A | 52.3 | 53.5 | 49 7 | 4.5 |

# DAILY SUMMARY.

| Day. | Humidity. | | | Wind. | | | | | Precipitation. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Mean Dew Point. | Mean Force vapor. | Mean Relative Humidity. | Prevailing Direction. | Total Movement in Miles. | Maximum Pressure Per Square Ft | Miles per Hour. | Time. | Beginning. | Ending. | Total in Inches. | |
| | | | | | | | | | | | Rain.** | Snow. |
| 1 | 64.0 | .677 | 89.5 | S. | 63 | 0.5 | 10 | 4 P | | | | |
| 2 | 67.5 | .732 | 94.0 | S. | 81 | 0.0 | — | — | 3 A | 4 A | .01 | |
| 3 | 64.0 | .755 | 80.5 | S. | 143 | 0.5 | 10 | 3 P | | | | |
| 4 | 57.5 | .545 | 86.0 | N.N.E. | 95 | 0.0 | — | — | 8 A | 12 P | .52 | |
| 5 | 55.5 | .477 | 93.0 | N.N.E. | 9 | 0.0 | — | — | 0 A | 8:30 A | .67 | |
| 6 | 57.5 | .546 | 89.5 | W. | 41 | 0.0 | — | — | | | | |
| 7 | 59.5 | .586 | 89.5 | S. | 86 | 0.0 | — | — | 3 P | 12 P | .04 | |
| 8 | 62.0 | .701 | 80.5 | W.N.W. | 100 | 3.5 | 26 | 5 P | 5:30 P | | T | |
| 9 | 40.5 | .414 | 61.0 | N. | 219 | 6.0 | 35 | 9 A | | | | |
| 10 | 42.0 | .360 | 75.0 | N. | 97 | 1.0 | 14 | 1 P | | | | |
| 11 | 42.5 | .360 | 77.0 | N.E. | 29 | 0.0 | — | — | | | | |
| 12 | 50.5 | .447 | 85.5 | E.S.E. | 49 | 0.0 | — | — | | | | |
| 13 | 44.5 | .485 | 62.0 | W.N.W. | 259 | 5.0 | 32 | 2 P | 0 A | 4 A | .10 | |
| 14 | 39.5 | .351 | 79.5 | N.N.W. | 122 | 1.0 | 14 | 9 P | | | | |
| 15 | 37.5 | .298 | 76.0 | N.N.W. | 57 | 0.0 | — | — | | | | |
| 16 | 41.0 | .361 | 74.5 | N. | 51 | 0.0 | — | — | | | | |
| 17 | 53.5 | .527 | 81.5 | S. | 197 | 2.0 | 20 | 5 P | 3 A | 12 P | .08 | |
| 18 | 58.5 | .583 | 85.0 | S. | 129 | 4.0 | 28 | 10 A | 0 A | 12 P | .13 | |
| 19 | 52.5 | .433 | 91.0 | N. | 103 | 0.0 | — | — | 0 A | 12 P | .18 | |
| 20 | 54.0 | .462 | 89.5 | N.N.E. | 80 | 0.0 | — | — | 7 P | 12 P | .11 | |
| 21 | 61.5 | .611 | 92.0 | S.E. | 122 | 0.5 | 10 | 10 A | 0 A | 12 P | .23 | |
| 22 | 62.5 | .683 | 85.0 | S. | 293 | 6.5 | 36 | 5 A | 0 A | 3 P | .49 | |
| 23 | 45.0 | .410 | 72.5 | N.W. | 104 | 0.5 | 10 | 1 P | | | | |
| 24 | 45.0 | .385 | 77.5 | N. | 36 | 0.0 | — | — | | | | |
| 25 | 47.5 | .434 | 80.0 | W. | 41 | 0.0 | — | — | | | | |
| 26 | 54.0 | .491 | 88.0 | S. | 113 | 0.5 | 10 | 5 P | | | | |
| 27 | 43.5 | .454 | 62.5 | N.N.W. | 200 | 2.5 | 22 | 9 A | | | | |
| 28 | 36.5 | .348 | 63.5 | S.W. | 110 | 0.5 | 10 | 4 P | | | | |
| 29 | 46.5 | .444 | 73.0 | S.W. | 139 | 0.5 | 10 | 2 P | | | | |
| 30 | 44.5 | .429 | 70.5 | N.E. | 52 | 0.0 | — | — | | | | |

**Rain or melted snow at base of tower. *Included in following day.

## REMARKS

The weather during September was generally seasonable, although some of the weather elements showed considerable departures from their normals. The precipitation was much below the normal amount, although slightly greater than that of the preceding month. Every month since May has shown a marked deficiency in rainfall, and the accumulated deficiency since June 1st is nearly ten inches. The generally high barometer during the month was an important if not particularly noticeable feature.

A comparison of the records of the several elements with the normals shows the following interesting features: The mean barometer was the highest for that feature since 1894; the maximum and minimum pressures were both considerably greater than usual, while the range was nearly a normal value. The total wind movement was slightly below the average, and comparatively few days showed a large daily movement. More than the usual amount was from the South. Only two light gales were noted.

The mean temperature was slightly lower than the normal, while the maximum and minimum records were both close to the normal values for those records. The first frost was noted on the 10th, and killing frosts on the 15th and 16th. The coldest day was about the middle of the month,

The mean dew point was about three degrees lower than the normal, and the relative humidity was considerably greater than usual.

The total precipitation was about sixty per cent of the usual amount, and about one-half the total occurred during the equinoctial period. Water supplies are at a low stage in this vicinity.

The month was slightly more cloudy than usual.

J. E. OSTRANDER, Meteorologist

E. K. DEXTER, Observer.

BULLETIN No. 298. OCTOBER, 1913

# Meteorological Observations
AT THE
# MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.
*Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.*
*Height of Wind Instruments 72 ft.*

## MONTHLY SUMMARY.

### **Pressure.** In inches.

| | |
|---|---|
| Maximum reduced to freezing, | 30.21, 23d, 8 A. |
| Minimum reduced to freezing, | 28.85, 20th, 9P. |
| Reduced† maximum reading, | 30.52, 23d, 8 A. |
| Reduced† minimum reading, | 29.14, 20th, 9 P. |
| Mean semi-daily reduced, | 29.970 |
| Monthly range, | 1.38 |

### ***Air Temperature.** In Degrees Fahr.

| | |
|---|---|
| Highest, | 79.0, 10th, 4 P. |
| Lowest, | 24.5, 31st, 12 P |
| Mean hourly, | 54.7 |
| Mean of means of max. and min., | 55.5 |
| Mean sensible (wet bulb), | 50.3 |
| Monthly range, | 54.5 |
| Highest mean daily, | 68.0, 10th |
| Lowest mean daily, | 33.8, 31st |
| Mean maximum, | 63.5 |
| Mean minimum, | 47.5 |
| Mean daily range, | 16.0 |
| Greatest daily range, | 31.0, 23d |
| Least daily range, | 4.5, 1st |

### **Humidity.**

| | |
|---|---|
| Mean dew point, | 46.5 |
| Mean force of vapor, | .424 |
| Mean relative humidity, | 79.2 |

### **Precipitation.** In inches.

| | |
|---|---|
| Total precipitation, | 5.16 |
| Number of days on which .01 inch or more rain fell, | 15 |
| Total snow in inches | Trace |

### **Wind.**

| | |
|---|---|
| Total movement, | 4698m. |
| Greatest daily movement, | 490m., 21st |
| Least daily movement, | 13m., 9th |
| Mean daily movement, | 151 m |
| Mean hourly velocity, | 6.3 m |

Maximum pressure per square foot, 23.0 lbs.= 68m. per hour, 14th, 1P., N.N.E.

Maximum velocity for 5 minutes, 36m. per hour, 20th, 8P., S.S.W.

Prevailing Direction, North.

### Summary.

| | |
|---|---|
| North | 26 per cent. |
| North Northeast | 16 " " |
| Northwest | 10 " " |
| Other directions | 48 " " |

### **Weather.**

| | |
|---|---|
| Mean cloudiness observed, | 63 per cent. |
| Total cloudiness recorded by the Sun Thermometer, | 250 hrs.=73 per cent. |
| Number of clear days, | 3 |
| Number of fair days, | 10 |
| Number of cloudy days, | 18 |

### **Bright Sunshine.**

Number of hours recorded, 91 hrs=27%.

**Rain,** 1st, 2d, 7th, 8th, 9th, 11th, 12th, 13th 14th, 15th, 18th, 19th, 20th, 24th, 25th, 26th, 27th, 28th, 30th.

**Snow,** 31st.

**Hail,** 14th.

**Frosts,** 22d, 23d, 31st.

**Thunder and Lightning,** none.

**Gales,** 35 or more miles per hour: 68m, 14th, N.N.E.; 44m, 20th, S.S.W.; 35m, 21st, W.S.W.

*Temperature in ground shelter.
†Reduced to freezing and sea-level.

# DAILY SUMMARY.

| Day. | Barometer Reduced to Sea Level. | | | Temperature. Ground Shelter. | | | | | | | No. Hours of Bright Sunshine |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Maximun. | Minimum. | Mean. Semi-daily. | Maximum | Time. | Minimum. | Time. | Mean of Max. and Min. | Mean Hourly Draper. | Mean Sensible Wet Bulb. | |
| 1 | 30.09 | 29.73 | 29.950 | 53.5 | 12 P | 49.0 | 6 A | 51.3 | 50.9 | 48.5 | 0.0 |
| 2 | 29.73 | 29.25 | 29.378 | 59.5 | 3 P | 53.5 | 0 A | 56.5 | 56.4 | 54.7 | 0.0 |
| 3 | 29.68 | 29.33 | 29.565 | 65.5 | 1 P | 46.5 | 6:30 A | 56.0 | 56.5 | 50.5 | 6.5 |
| 4 | 29.91 | 29.68 | 29.826 | 71.5 | 3:30 P | 53.5 | 6 A | 62.5 | 61.4 | 54.0 | 9.1 |
| 5 | 30.11 | 29 91 | 30.047 | 78.5 | 3 P | 55.0 | 5:30 A | 66.7 | 64.0 | 55.3 | 7.9 |
| 6 | 30.22 | 30.11 | 30.197 | 68.5 | 3 P | 46.5 | 4:30 A | 57.5 | 58.4 | 55.7 | 0.5 |
| 7 | 30.26 | 30.21 | 30.248 | 68.0 | 3 P | 60.5 | 0:30 A | 64.3 | 63.6 | 61.0 | 0 0 |
| 8 | 30.23 | 30.15 | 30.192 | 74.5 | 4 P | 61.5 | 5:30 A | 68.0 | 66.5 | 62.5 | 3.7 |
| 9 | 30.16 | 30.10 | 30.135 | 73.5 | 12:30 P | 63.5 | 5:30 A | 68.5 | 67.2 | 63.5 | 3.1 |
| 10 | 30.18 | 30.09 | 30.139 | 79.0 | 4 P | 63.5 | 6 A | 71.3 | 68.0 | 63.7 | 5.7 |
| 11 | 30.15 | 29.94 | 30.051 | 69.5 | 11:30 A | 62.0 | 6 A | 65.7 | 64 6 | 60.7 | 0.6 |
| 12 | 29.99 | 29.91 | 29.958 | 62.0 | 4 P | 55.0 | 8 A | 58.5 | 55.3 | 50.5 | 2.2 |
| 13 | 30.07 | 29.90 | 30.006 | 52.5 | 12:30 P | 35.5 | 7 A | 44.0 | 44.4 | 40.7 | 0.0 |
| 14 | 30.09 | 29.78 | 29.960 | 57 0 | 3 P | 37.5 | 6:30 A | 47.3 | 47.5 | 38.0 | 5.1 |
| 15 | 29.89 | 29.76 | 29 885 | 62.5 | 2 P | 43.5 | 6 A | 53 0 | 51.9 | 56.5 | 4.7 |
| 16 | 30 03 | 29.82 | 29.923 | 68.0 | 1 P | 52.7 | 3 A | 60.3 | 58.4 | 51.5 | 4.5 |
| 17 | 30.10 | 30.03 | 30.079 | 71.0 | 3:30 P | 47.5 | 5:30 A | 59.3 | 58.0 | 52.3 | 9.7 |
| 18 | 30.06 | 29.91 | 29.983 | 66.0 | 1 P | 45.5 | 6:30 A | 55 7 | 57.3 | 53.0 | 3.0 |
| 19 | 30.02 | 29.76 | 29.943 | 57.0 | 0 A | 49 5 | 12 P | 53.3 | 53.2 | 49.0 | 0.0 |
| 20 | 29.76 | 29.14 | 29.233 | 65.0 | 6 P | 49.5 | 0 A | 57.7 | 58.7 | 57.0 | 0.2 |
| 21 | 30.02 | 29.23 | 29 693 | 54.5 | 12:30 P | 42.0 | 12 P | 48.3 | 48.1 | 40.7 | 4 2 |
| 22 | 30.41 | 30.02 | 30.347 | 57.5 | 3:30 P | 29.5 | 7 A | 43.5 | 41.7 | 33.0 | 9.2 |
| 23 | 30.52 | 30.38 | 30.465 | 60.0 | 3 P | 29 0 | 6:30 A | 44.5 | 44.3 | 36.7 | 8.3 |
| 24 | 30.38 | 29.92 | 30.152 | 61.0 | 12 P | 43 0 | 3 A | 52.0 | 49 7 | 48.5 | 0.0 |
| 25 | 29.92 | 29.81 | 29.877 | 64.0 | 3 P | 59.0 | 12 P | 61 5 | 62.3 | 60.7 | 0.0 |
| 26 | 29.86 | 29.74 | 29.809 | 60.5 | 5:30 A | 51.0 | 12 P | 55.7 | 55.3 | 53.5 | 0.0 |
| 27 | 29.98 | 29.80 | 29 939 | 62.5 | 4 P | 43.5 | 12 P | 53.0 | 51.7 | 47.7 | 6.7 |
| 28 | 29.98 | 29.80 | 29.911 | 69.0 | 3:30 P | 42.0 | 3 A | 55.5 | 52.3 | 50.3 | 1.4 |
| 29 | 30.00 | 29 79 | 29 915 | 66.0 | 3:30 P | 39.5 | 6:30 A | 52.7 | 50.4 | 44.0 | 8.5 |
| 30 | 30.10 | 29 73 | 29.925 | 50.5 | 12:30 P | 38.5 | 12 P | 44.5 | 44.5 | 39.3 | 4.3 |
| 31 | 30.37 | 30.10 | 30.274 | 42.0 | 12:30 P | 24.5 | 12 P | 33.3 | 33.8 | 27.3 | 2.9 |

# DAILY SUMMARY.

| Day. | Humidity. | | | Wind. | | | | | Precipitation. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Mean Dew Point. | Mean Force vapor. | Mean Relative Humidity. | Prevailing Direction. | Total Movement in Miles. | Maximum Pressure Per Square Ft | Miles per Hour. | Time. | Beginning. | Ending. | Total in Inches. Rain.** | Total in Inches. Snow. |
| 1 | 46.5 | .364 | 88.5 | S.E. | 95 | 0.0 | — | — | 3 A | 12 P | .35 | |
| 2 | 54.0 | .457 | 89.5 | N.N.W. | 120 | 0.0 | — | — | 0 A | 9 P | .23 | |
| 3 | 46.5 | .429 | 75.0 | N.N.W. | 144 | 3.0 | 24 | 11 P | | | | |
| 4 | 48.5 | .523 | 66.5 | N. | 383 | 4.5 | 30 | 10 A | | | | |
| 5 | 51.0 | .526 | 72.0 | N. | 200 | 1.0 | 14 | 2 A | | | | |
| 6 | 53.5 | .489 | 87.0 | N. | 41 | 0.0 | — | — | | | | |
| 7 | 59.5 | .583 | 87.0 | N. | 23 | 0.0 | — | — | 5 P | 12 P | T | |
| 8 | 61.0 | .613 | 88.0 | S.S.E. | 22 | 0.0 | — | — | 7 P | 12 P | .01 | |
| 9 | 62.0 | .623 | 91.0 | E. | 13 | 0.5 | 10 | 6 P | 0 A | 2 P | .01 | |
| 10 | 62.0 | .638 | 88.5 | S. | 31 | 0.0 | — | — | | | | |
| 11 | 59.0 | .577 | 86.5 | S.S.E. | 107 | 0.0 | — | — | 10 P | 12 P | .01 | |
| 12 | 49.5 | .383 | 93.5 | N.N.E. | 125 | 4.5 | 30 | 11 A | 0 A | 9 A | .74 | |
| 13 | 39.0 | .275 | 87.5 | N. | 65 | 2.0 | 20 | 9 P | 12 M | 6 P | .13 | |
| 14 | 27.5 | .293 | 53.5 | N. | 413 | 23.0 | 68 | 1 P | 4 P | 9 P | .10 | |
| 15 | 40.5 | .385 | 66.5 | N.N.E. | 361 | 4.5 | 30 | 7 P | 5 P | | T | |
| 16 | 47.0 | .458 | 70.0 | N.N.E. | 339 | 5.0 | 32 | 1 P | | | | |
| 17 | 49.5 | .446 | 78.5 | N.N.E. | 134 | 1.5 | 17 | 11 A | | | | |
| 18 | 50.5 | .448 | 84.0 | S.S.W. | 87 | 0.0 | — | — | 8 P | 12 P | .09 | |
| 19 | 46.5 | .383 | 84.0 | N. | 130 | 0.0 | — | — | 0 A | 12 P | .09 | |
| 20 | 54.0 | .525 | 82.0 | S.S.W. | 285 | 9.5 | 44 | 9 P | 0 A | 6 P | .76 | |
| 21 | 33.0 | .313 | 60.0 | W.S.W. | 490 | 6.0 | 35 | 12 M | | | | |
| 22 | 25.5 | .221 | 63.0 | N. | 88 | 0.0 | — | — | | | | |
| 23 | 31.5 | .259 | 71.0 | N.E. | 60 | 0.0 | — | — | | | | |
| 24 | 46.5 | .367 | 88.5 | S.E. | 27 | 2.5 | 22 | 10 P | 10 A | 12 P | .26 | |
| 25 | 60.0 | .559 | 93.5 | S. | 160 | 2.0 | 20 | 1 A | 0 A | 12 P | 1.67 | |
| 26 | 52.5 | .437 | 91.0 | N.N.E. | 167 | 0.0 | — | — | 0 A | 12 P | .65 | |
| 27 | 45.0 | .363 | 83.0 | W.S.W. | 88 | 0.0 | — | — | 0 A | 4 A | T | |
| 28 | 47.5 | .424 | 83.5 | W. | 72 | 0.0 | — | — | 12 M | 12:30 P | .06 | |
| 29 | 40.5 | .321 | 80.5 | N.W. | 54 | 0.0 | — | — | | | | |
| 30 | 31.0 | .299 | 59.5 | N.W. | 194 | 3.0 | 24 | 9 A | 3 P | | T | |
| 31 | 19.5 | .171 | 63.5 | N.N.W. | 180 | 3.5 | 26 | 1 P | 10 A | | | T |

**Rain or melted snow at base of tower. *Included in following day.

## REMARKS

During October the most noticeable feature of the weather was the large amount of cloudiness and the frequency of precipitation. Precipitation occurred on twenty dates and a measureable amount on fifteen days. For the first time since May the monthly precipitation was more than the normal. Several rainstorms of moderate amount occurred prior to the 21st. The storm of the 24th-26th, however, was by far the heaviest of the month. One half the total precipitation occurred at this time and the drought which had prevailed for several months was effectually broken. Notwithstanding the large amount of cloudiness the month was much warmer than usual.

An analysis of the records of the several weather elements shows the following as the more important features: The mean barometer was considerably lower than the normal and the range larger than usual. The maximum pressure for the month followed the minimum in less than two and one-half days. The total wind movement was large for the time of year and an unusually large amount was from the North.

The mean temperature was about five degrees above the normal while the maximum was practically normal. The minimum temperature was slightly higher than the normal for this element and was reached at midnight of the last day of the month. Until the last day the minimum for the month was 29 degrees, an exceptionally high figure.

The mean dew point was about five degrees higher than usual and the relative humidity about five points above the normal.

The total precipitation was about forty per cent more than the normal and was well distributed. A light snow flurry occurred on the last day of the month.

Only three gales were registered during the month; the one on the 14th was unusually heavy for this locality.

J. E. OSTRANDER, Meteorologist

E. K. DEXTER, Observer.

BULLETIN No. 299. NOVEMBER, 1913

# Meteorological Observations
AT THE
# MASSACHUSETTS
# AGRICULTURAL EXPERIMENT
# STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.
*Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.*
*Height of Wind Instruments 72 ft.*

## MONTHLY SUMMARY.

### **Pressure.** In inches.

| | |
|---|---|
| Maximum reduced to freezing, | 30.41, 28th, 11 A. |
| Minimum reduced to freezing, | 28.78, 9th, 5 P. |
| Reduced† maximum reading, | 30.72, 28th, 11 A. |
| Reduced† minimum reading, | 29.07, 9th, 5 P. |
| Mean semi-daily reduced, | 30.129 |
| Monthly range, | 1.65 |

### ***Air Temperature.** In Degrees Fahr.

| | |
|---|---|
| Highest, | 68.0, 20th, 12 M. |
| Lowest, | 23.0, 1st, 5:30A; 27th, 7:30A; 28th, 4:30A. |
| Mean hourly, | 41.6 |
| Mean of means of max. and min., | 41.8 |
| Mean sensible (wet bulb), | 36.6 |
| Monthly range, | 45.0 |
| Highest mean daily, | 58.5, 9th |
| Lowest mean daily, | 28.5, 28th |
| Mean maximum, | 50.7 |
| Mean minimum, | 32.9 |
| Mean daily range, | 17.8 |
| Greatest daily range, | 40.5, 6th |
| Least daily range, | 3.5, 16th |

### **Humidity.**

| | |
|---|---|
| Mean dew point, | 32.1 |
| Mean force of vapor, | .259 |
| Mean relative humidity, | 74.0 |

### **Precipitation.** In inches.

| | |
|---|---|
| Total precipitation, | 2.11 |
| Number of days on which .01 inch or more rain fell, | 9 |
| Total snow in inches | 2.5 |

*Temperature in ground shelter.
†Reduced to freezing and sea-level.

### **Wind.**

| | |
|---|---|
| Total movement, | 5003m. |
| Greatest daily movement, | 497m., 10th |
| Least daily movement, | 37m., 6th |
| Mean daily movement, | 167 m |
| Mean hourly velocity, | 7.0 m. |

Maximum pressure per square foot, 14.5 lbs.= 54m. per hour, 23d, 1P., N.W.
Maximum velocity for 5 minutes, 39m. per hour, 9th, 5P., S.E.
Prevailing Direction, Northwest.

### Summary.

| | |
|---|---|
| North | 13 per cent. |
| North Northwest | 13 " " |
| Northwest | 17 " " |
| West Northwest | 10 " " |
| South Southwest | 10 " " |
| Other directions | 37 " " |

### **Weather.**

| | |
|---|---|
| Mean cloudiness observed, | 53 per cent. |
| Total cloudiness recorded by the Sun Thermometer, | 180 hrs.=61 per cent. |
| Number of clear days, | 4 |
| Number of fair days, | 10 |
| Number of cloudy days, | 16 |

### **Bright Sunshine.**

Number of hours recorded, 113 hrs=39%.

**Rain,** 3d, 4th, 8th, 9th, 13th, 14th, 19th, 20th, 24th, 28th, 29th.

**Snow,** 16th, 28th, 29th.

**Hail,**

**Frosts,**

**Thunder and Lightning,**

**Gales,** 35 or more miles per hour: 38m, 1st, W; 43m, 4th, N.W.; 53m, 9ht, S.E.; 41m, 10th, S.S.W.; 54m, 23d, N.W.

# DAILY SUMMARY.

| Day. | Barometer Reduced to Sea Level. | | | Temperature. Ground Shelter. | | | | | | | No. Hours of Bright Sunshine. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Maximun. | Minimum. | Mean. Semi-daily. | Maximum | Time. | Minimum. | Time. | Mean of Max. and Min. | Mean Hourly Draper. | Mean Sensible Wet Bulb. | |
| 1 | 30.37 | 30.06 | 30.187 | 47.5 | 3:30 P | 23.0 | 5:30 A | 35.3 | 37.7 | 33.7 | 6.1 |
| 2 | 30.36 | 30.12 | 30.308 | 51.0 | 3 P | 34.0 | 12 P | 42.5 | 43.6 | 37.0 | 2.0 |
| 3 | 30.40 | 30.08 | 30.291 | 54.0 | 2:30 P | 32.0 | 6 A | 43.0 | 42.5 | 37.3 | 2.2 |
| 4 | 30.09 | 29.93 | 29.999 | 52.5 | 12 M | 40.0 | 12 P | 46.3 | 45.8 | 39.5 | 4.4 |
| 5 | 30.28 | 30.09 | 30.255 | 49.0 | 2 P | 30.0 | 12 P | 39.5 | 38.0 | 30.5 | 8.5 |
| 6 | 30.30 | 30.21 | 30.263 | 65.0 | 3 P | 24.5 | 7 A | 44.7 | 42.0 | 34.0 | 8.6 |
| 7 | 30.23 | 30.10 | 30.184 | 66.5 | 3 P | 27.5 | 7 A | 47.0 | 44.2 | 35.5 | 7.5 |
| 8 | 30.12 | 29.76 | 29.961 | 58.0 | 12 P | 34.5 | 5 A | 46.3 | 45.4 | 46.3 | 0.0 |
| 9 | 29.76 | 29.07 | 29.365 | 64.5 | 2 P | 49.0 | 12 P | 56.7 | 58.5 | 55.3 | 0.0 |
| 10 | 29.77 | 29.32 | 29.638 | 49.0 | 0 A | 31.0 | 12 P | 40.0 | 40.3 | 32.5 | 3.0 |
| 11 | 30.02 | 29.77 | 29.909 | 38.5 | 3 P | 24.5 | 7:30 A | 31.5 | 32.5 | 28.0 | 6.0 |
| 12 | 30.24 | 30.02 | 30.203 | 46.5 | 2:30 P | 32.0 | 9 P | 39.3 | 37.4 | 31.7 | 6.0 |
| 13 | 30.19 | 30.03 | 30.094 | 52.0 | 4 P | 36.0 | 0 A | 44.0 | 44.7 | 40.7 | 0.1 |
| 14 | 30.22 | 29.99 | 30.093 | 47.0 | 12 M | 32.0 | 12 P | 39.5 | 42.5 | 38.0 | 0.0 |
| 15 | 30.31 | 30.21 | 30.255 | 43.5 | 2:30 P | 25.5 | 7:30 A | 34.5 | 33.9 | 28.0 | 7.1 |
| 16 | 30.21 | 30.00 | 30.092 | 33.5 | 1 P | 30.0 | 7 A | 31.7 | 31.8 | 30.7 | 0.0 |
| 17 | 30.07 | 29.98 | 30.017 | 48.5 | 3:30 P | 29.5 | 7 A | 39.0 | 36.8 | 32.0 | 8.7 |
| 18 | 30.01 | 29.91 | 29.985 | 59.0 | 2 P | 30.5 | 7:30 A | 44.7 | 44.0 | 37.3 | 6.2 |
| 19 | 30.08 | 29.87 | 29.995 | 55.0 | 12 M | 44.5 | 0:30 A | 49.7 | 50.8 | 46.7 | 0.5 |
| 20 | 30.07 | 29.82 | 29.939 | 68.0 | 12 M | 49.5 | 12 P | 58.7 | 58.3 | 51.3 | 7.5 |
| 21 | 30.30 | 30.07 | 30.263 | 60.0 | 3 P | 35.0 | 7:30 A | 47.5 | 47.2 | 40.0 | 8.0 |
| 22 | 30.29 | 30.04 | 30.195 | 64.0 | 3 P | 47.0 | 3 A | 55.5 | 54.5 | 51.5 | 3.5 |
| 23 | 30.04 | 29.81 | 29.932 | 65.0 | 11:30 A | 43.0 | 12 P | 54.0 | 52.5 | 46.7 | 2.3 |
| 24 | 30.02 | 29.84 | 29.952 | 43.0 | 0 A | 30.5 | 6:30 A | 36.7 | 37.1 | 32.3 | 0.4 |
| 25 | 30.20 | 30.00 | 30.157 | 43.5 | 3:30 P | 33.0 | 8:30 P | 38.3 | 36.8 | 30.7 | 7.0 |
| 26 | 30.31 | 29.95 | 30.103 | 50.0 | 3 P | 28.0 | 12 P | 39.0 | 40.0 | 32.7 | 1.8 |
| 27 | 30.63 | 30.31 | 30.585 | 36.0 | 3 P | 23.0 | 7:30 A | 29.5 | 29.5 | 25.0 | 6.0 |
| 28 | 30.72 | 30.54 | 30.647 | 32.5 | 2 P | 23.0 | 4:30 A | 27.7 | 28.5 | 27.7 | 0.0 |
| 29 | 30.54 | 30.42 | 30.469 | 38.0 | 4 P | 31.0 | 3 A | 34.5 | 33.9 | 33.5 | 0.0 |
| 30 | 30.55 | 30.47 | 30.520 | 40.0 | 3 P | 33.5 | 7:30 A | 36.7 | 36.5 | 33.3 | 0.0 |

# DAILY SUMMARY.

| Day. | Humidity. | | | Wind. | | | | | Precipitation. | | Total in Inches. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Mean Dew Point. | Mean Force vapor. | Mean Relative Humidity. | Prevailing Direction. | Total Movement in Miles. | Maximum Pressure Per Square Ft | Miles per Hour. | Time. | Beginning. | Ending. | Rain.** | Snow. |
| 1 | 27.0 | .233 | 69.5 | W.N.W. | 231 | 7.0 | 38 | 11 A | | | | |
| 2 | 30.0 | .263 | 64.5 | N.N.W. | 209 | 1.0 | 14 | 11 A | | | | |
| 3 | 32.5 | .258 | 73.0 | S.S.W. | 110 | 1.0 | 14 | 3 P | 8 A | | T | |
| 4 | 33.5 | .285 | 70.0 | N.W. | 334 | 9.0 | 43 | 1 A | 1 A | 10 A | .05 | |
| 5 | 36.0 | .198 | 49.5 | N.W. | 209 | 1.5 | 17 | 2 A | | | | |
| 6 | 26.0 | .247 | 62.5 | N.W. | 37 | 0.0 | — | — | | | | |
| 7 | 30.0 | .255 | 73.0 | S. | 65 | 0.5 | 10 | 3 P | | | | |
| 8 | 45.5 | .344 | 93.5 | W. | 46 | 0.0 | — | — | 5 A | 12 P | .13 | |
| 9 | 53.5 | .478 | 85.5 | S.E. | 336 | 14.0 | 53 | 5 P | 0 A | 9 P | .65 | |
| 10 | 23.5 | .221 | 58.5 | S.S.W. | 497 | 8 5 | 41 | 1 P | | | | |
| 11 | 20.0 | .180 | 63 0 | S.W. | 236 | 1.0 | 14 | 5 P | | | | |
| 12 | 25.0 | .205 | 68.0 | W.N.W. | 215 | 1.0 | 14 | 8 A | | | | |
| 13 | 34.5 | .302 | 67.0 | S.S.W. | 185 | 0.5 | 10 | 4 P | 12 M | | T | |
| 14 | 33 0 | .257 | 75.0 | N. | 85 | 0.5 | 10 | 9 P | 9 A | 2 P | .12 | |
| 15 | 20.5 | .177 | 65.5 | N.N.W. | 89 | 0.0 | — | — | | | | |
| 16 | 29.0 | .175 | 95.0 | N.N.W. | 46 | 0.0 | — | — | 2 A | 11 P | .20 | .5 |
| 17 | 28.5 | .195 | 84.5 | N. | 76 | 0.0 | — | — | | | | |
| 18 | 33.0 | .260 | 74.5 | S.W. | 88 | 0.0 | — | — | | | | |
| 19 | 43.5 | .361 | 80.0 | S.E. | 71 | 1.0 | 14 | 12 P | 9 A | 12 P | .01 | |
| 20 | 47.0 | .451 | 72.5 | W.S.W. | 289 | 5.5 | 33 | 1 P | 0 A | 5 A | .11 | |
| 21 | 35.5 | .288 | 77.0 | N. | 49 | 0.5 | 10 | 9 P | | | | |
| 22 | 49.0 | .410 | 87.5 | S. | 165 | 0.0 | — | — | | | | |
| 23 | 42.0 | .372 | 74.5 | W.N.W. | 263 | 14.5 | 54 | 1 P | | | | |
| 24 | 26.5 | .204 | 72.5 | N.W. | 82 | 1.5 | 17 | 10 P | 11 A | 3 P | T | |
| 25 | 22.5 | .203 | 60.5 | N.N.W. | 247 | 2.5 | 22 | 3 A | | | | |
| 26 | 29.0 | .243 | 69.0 | N.W. | 249 | 2.5 | 22 | 7 P | | | | |
| 27 | 18.5 | .152 | 69.0 | N.E. | 119 | 0.5 | 10 | 3 A | | | | |
| 28 | 26.5 | .154 | 94.0 | N.N.E. | 70 | 0 0 | — | — | 2 P | 12 P | .12 | 1.0 |
| 29 | 30.5 | .199 | 85.5 | N. | 152 | 2.5 | 22 | 6 P | 0 A | 12 M | .69 | 1.0 |
| 30 | 30.5 | .202 | 85.5 | N.N.E. | 147 | 1.0 | 14 | 9 A | | | | |

**Rain or melted snow at base of tower. *Included in following day.

## REMARKS

The weather during the month was considerably warmer than usual at this time of year and a comparatively small range of temperature. A comparatively high barometer, with a considerable number of gales was also a feature of more than passing interest. The precipitation was much less than the November average.

An examination of the records of the several weather elements and comparison with the means for the month shows the following features of interest: The mean barometer was nearly one-tenth of an inch higher than the normal for November and the range was unusually large. On the 9th a rapid fall was noted, culminating in the lowest record for the month. During the last week of the month an unusually high barometer prevailed.

The total wind movement was large and two gales of more than 50 miles per hour were registered on the pressure chart. Much of the wind was from the Northwest quadrant.

The mean temperature was about four degrees higher than the normal and the maximum and minimum for the month were both high—the minimum being more than eleven degrees higher than the normal for this element for November. The range was unusually small. The range on the 6th was nearly as large as the total range for the month.

The mean dew point was high and the relative humidity less than the normal value.

The total precipitation was about two-thirds of the normal and was fairly well distributed throughout the month.

The ground was frozen but little during the month. As a result the last snow and rainfall added considerably to the moisture in the ground.

The amount of sunshine recorded was slightly less than the normal-

J. E. OSTRANDER, Meteorologist

E. K. DEXTER, Observer.

BULLETIN No. 300. DECEMBER, 1913

# Meteorological Observations
AT THE
# MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.
*Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.*
*Height of Wind Instruments 72 ft.*

## MONTHLY SUMMARY.

### **Pressure.** In inches.

| | |
|---|---|
| Maximum reduced to freezing, | 30.16, 1st, 0 A. |
| Minimum reduced to freezing, | 28.82, 8th, 3 A. |
| Reduced† maximum reading, | 30.47, 1st, 0 A. |
| Reduced† minimum reading, | 29.13, 8th, 3 A. |
| Mean semi-daily reduced, | 30.013 |
| Monthly range, | 1.34 |

### ***Air Temperature.** In Degrees Fahr.

| | |
|---|---|
| Highest, | 53.0, 7th, 6P.; 14th, 2P. |
| Lowest, | 5.0, 28th, 8:30A. |
| Mean hourly, | 31.3 |
| Mean of means of max. and min., | 32.0 |
| Mean sensible (wet bulb), | 27.4 |
| Monthly range, | 48.0 |
| Highest mean daily, | 43.7, 5th |
| Lowest mean daily, | 12.4, 28th |
| Mean maximum, | 40.7 |
| Mean minimum, | 23.3 |
| Mean daily range, | 17.4 |
| Greatest daily range, | 27.5, 30th |
| Least daily range, | 7.5, 25th |

### **Humidity.**

| | |
|---|---|
| Mean dew point, | 23.5 |
| Mean force of vapor, | .169 |
| Mean relative humidity, | 81.2 |

### **Precipitation.** In inches.

| | |
|---|---|
| Total precipitation, | 3.38 |
| Number of days on which .01 inch or more rain fell, | 9 |
| Total snow in inches | 4 |

### **Wind.**

| | |
|---|---|
| Total movement, | 4400m. |
| Greatest daily movement, | 350m., 8th |
| Least daily movement, | 11m., 29th |
| Mean daily movement, | 142 m |
| Mean hourly velocity, | 5.9 m |

Maximum pressure per square foot, 7.0 lbs.= 37m. per hour, 26th, 7A., N.N.E.

Maximum velocity for 5 minutes, 33m. per hour, 8th, 5A., W.N.W.

Prevailing Direction, North Northwest.

### Summary.

| | |
|---|---|
| Northwest | 19 per cent |
| North Northeast | 19 " " |
| North | 10 " " |
| South | 10 " " |
| South Southwest | 10 " " |
| West Northwest | 10 " " |
| North Northwest | 10 " " |
| Other directions | 12 " " |

### **Weather.**

| | |
|---|---|
| Mean cloudiness observed, | 45 per cent |
| Total cloudiness recorded by the Sun Thermometer, | 162 hrs.=57 per cent. |
| Number of clear days, | 7 |
| Number of fair days, | 10 |
| Number of cloudy days, | 14 |

### **Bright Sunshine.**

Number of hours recorded, . . 121 hrs=43%.

**Rain**, 1st, 7th, 8th, 23d, 24th, 25th, 26th.

**Snow**, 8th, 10th, 11th, 18th, 25th, 26th.

**Days of Sleighing**, 5.

**Gales**, 35 or more miles per hour: 36m, 8th, W.N.W.; 36m, 14th, W.; 37m, 26th, N.N.E.

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Temperature in ground shelter.
Reduced to freezing and sea-level.

# DAILY SUMMARY.

| Day. | Barometer Reduced to Sea Level. | | | Temperature. Ground Shelter. | | | | | | | No. Hours of Bright Sunshine |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Maximun. | Minimum. | Mean. Semi-daily. | Maximum | Time. | Minimum. | Time. | Mean of Max. and Min. | Mean Hourly Draper. | Mean Sensible Wet Bulb. | |
| 1 | 30.47 | 30.35 | 30.399 | 42.0 | 4:30 P | 34.0 | 7:30 A | 38.0 | 37.3 | 36.5 | 0.0 |
| 2 | 30.39 | 30.17 | 30.335 | 43.0 | 3 P | 29.0 | 7 A | 36.0 | 36.3 | 34.0 | 0.0 |
| 3 | 30.17 | 29.92 | 29.969 | 49.0 | 11:30 A | 33.0 | 12 P | 41.0 | 40.5 | 37.0 | 7.0 |
| 4 | 29.92 | 29.54 | 29.704 | 43.0 | 3 P | 31.0 | 7 A | 37.0 | 39.0 | 34.7 | 0.2 |
| 5 | 29.66 | 29.53 | 29.608 | 50.5 | 1:30 P | 37.0 | 7 A | 43.7 | 43.7 | 37.7 | 7.7 |
| 6 | 30.15 | 29.66 | 30.067 | 48.0 | 2 A | 30.0 | 12 P | 39.0 | 39.5 | 30.7 | 7.9 |
| 7 | 30.10 | 29.18 | 29.589 | 53.0 | 6 P | 29.0 | 1 A | 41.0 | 40.4 | 41.0 | 0.0 |
| 8 | 29.94 | 29.13 | 29.545 | 46.0 | 0 A | 27.0 | 8 A | 36.5 | 29.3 | 24.0 | 0.0 |
| 9 | 30.25 | 29.94 | 30.232 | 39.0 | 3 P | 20.5 | 6 A | 29.7 | 27.0 | 22.3 | 7.5 |
| 10 | 30.17 | 29.76 | 29.923 | 36.0 | 5:30 P | 19.5 | 4:30 A | 27.7 | 28.5 | 26.5 | 1.5 |
| 11 | 30.12 | 29.73 | 29.955 | 33.0 | 1 P | 16.0 | 12 P | 24.5 | 26.8 | 23.7 | 2.7 |
| 12 | 30.13 | 29.96 | 30.036 | 41.5 | 3:30 P | 14.5 | 6 A | 28.0 | 25.9 | 21.3 | 6.0 |
| 13 | 30.11 | 30.02 | 30.073 | 48.5 | 2 P | 22.0 | 7:30 A | 35.3 | 34.4 | 26.7 | 6.7 |
| 14 | 30.04 | 29.78 | 29.889 | 53.0 | 2 P | 26.5 | 6 A | 39.7 | 39.1 | 33.7 | 6.2 |
| 15 | 30.23 | 29.98 | 30.191 | 40.0 | 0 A | 25.5 | 12 P | 32.7 | 30.7 | 24.7 | 7.7 |
| 16 | 30.17 | 29.95 | 30.028 | 34.0 | 12 P | 24.5 | 1 A | 29.3 | 30.0 | 30.3 | 0.0 |
| 17 | 29.99 | 29.79 | 29.881 | 49.5 | 3 P | 34.0 | 0 A | 41.7 | 40.7 | 34.3 | 6.3 |
| 18 | 29.95 | 29.71 | 29.797 | 43.5 | 1:30 A | 23.5 | 12 P | 33.5 | 34.6 | 31.0 | 3.0 |
| 19 | 30.15 | 29.95 | 30.097 | 31.0 | 2:30 P | 16.5 | 8 A | 23.7 | 23.0 | 18.3 | 7.3 |
| 20 | 30.06 | 29.91 | 29.989 | 41.0 | 3:30 P | 17.0 | 7:30 A | 29.0 | 29.3 | 25.3 | 4.0 |
| 21 | 30.01 | 29.90 | 29.979 | 43.5 | 3 P | 27.0 | 7:30 A | 35.3 | 35.4 | 30.3 | 2.2 |
| 22 | 30.43 | 30.01 | 30.488 | 42.0 | 2 P | 28.5 | 12 P | 35.3 | 33.6 | 27.7 | 4.3 |
| 23 | 30.44 | 30.01 | 30.483 | 37.5 | 4 P | 28.5 | 0 A | 33.0 | 32.5 | 31.0 | 0.0 |
| 24 | 30.04 | 29.88 | 29.667 | 43.0 | 2 P | 29.0 | 11 P | 36.0 | 35.1 | 31.5 | 4.3 |
| 25 | 30.08 | 29.74 | 29.953 | 34.5 | 4 P | 27.0 | 8 A | 30.7 | 31.0 | 28.7 | 0.0 |
| 26 | 29.74 | 29.25 | 29.479 | 33.5 | 12 M | 20.5 | 12 P | 27.0 | 29.5 | 27.7 | 0.0 |
| 27 | 30.35 | 29.66 | 30.189 | 29.5 | 3:30 P | 16.5 | 8 A | 23.0 | 20.5 | 15.0 | 7.9 |
| 28 | 30.36 | 30.26 | 30.313 | 28.5 | 3:30 P | 5.0 | 8:30 A | 16.7 | 12.4 | 8.5 | 5.5 |
| 29 | 30.29 | 30.04 | 30.172 | 33.0 | 3 P | 6.0 | 8 A | 19.5 | 15.7 | 11.3 | 7.5 |
| 30 | 30.05 | 29.92 | 29.981 | 37.0 | 4 P | 9.5 | 2:30 P | 23.3 | 22.0 | 22.7 | 2.5 |
| 31 | 30.13 | 30.03 | 30.099 | 35.0 | 2 P | 14.0 | 7:30 A | 24.5 | 25.1 | 21.3 | 4.7 |

# DAILY SUMMARY.

| Day. | Humidity. | | | Wind. | | | | | Precipitation. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Total in Inches. | |
| | Mean Dew Point. | Mean Force vapor. | Mean Relative Humidity. | Prevailing Direction. | Total Movement in Miles. | Maximum Pressure Per Square Ft | Miles per Hour. | Time. | Beginning. | Ending.* | Rain.** | Snow. |
| 1 | 35.0 | .223 | 93.5 | N.N.E. | 12 | 0.0 | — | — | 5 A | 12 P | .02 | |
| 2 | 32.0 | .204 | 91.5 | N.N.E. | 21 | 0.0 | — | — | | | | |
| 3 | 34.5 | .234 | 86.5 | N. | 216 | 4.0 | 28 | 11 A | | | | |
| 4 | 29.0 | .229 | 71.5 | N.W. | 128 | 0.5 | 10 | 11 P | | | | |
| 5 | 32.5 | .263 | 71.0 | N.W. | 229 | 1.5 | 17 | 2 P | | | | |
| 6 | 23.5 | .197 | 67.5 | N.N.E. | 187 | 0.0 | — | — | | | | |
| 7 | 39.5 | .274 | 96.0 | S.S.W. | 89 | 3.0 | 24 | 2 P | 4 A | 12 P | 1.11 | |
| 8 | 17.0 | .147 | 66.0 | N.W. | 350 | 6.5 | 36 | 5 A | 0 A | 5 P | .12 | ½ |
| 9 | 15.0 | .137 | 67.0 | N.N.W. | 181 | 1.0 | 14 | 1 A | | | | |
| 10 | 21.0 | .163 | 73.5 | S.S.W. | 186 | 0.0 | — | — | 8 P | 12 P | .04 | ½ |
| 11 | 20.0 | .137 | 84.0 | N.W. | 203 | 3.5 | 26 | 4 P | 8 A | 10 A | .04 | ½ |
| 12 | 17.5 | .125 | 83.5 | S.S.W. | 140 | 0.0 | — | — | | | | |
| 13 | 24.5 | .161 | 86.0 | N.E. | 69 | 3.0 | 24 | 1 P | | | | |
| 14 | 29.0 | .223 | 76.0 | W.N.W. | 177 | 6.5 | 36 | 12 M | | | | |
| 15 | 20.0 | .147 | 74.5 | W.N.W. | 286 | 3.0 | 24 | 1 A | | | | |
| 16 | 28.5 | .173 | 92.5 | S. | 45 | 0.0 | — | — | | | | |
| 17 | 30.5 | .217 | 78.0 | S. | 158 | 1.0 | 14 | 3 P | | | | |
| 18 | 28.0 | .181 | 87.0 | N.W. | 122 | 4.5 | 30 | 9 P | 7 P | | | T |
| 19 | 12.0 | .112 | 71.5 | N.W. | 247 | 2.5 | 22 | 5 A | | | | |
| 20 | 20.5 | .159 | 77.0 | S.S.E. | 101 | 2.0 | 20 | 6 P | | | | |
| 21 | 28.0 | .174 | 90.0 | S. | 52 | 2.0 | — | — | | | | |
| 22 | 22.0 | .168 | 73.5 | N.N.E. | 99 | 1.5 | 17 | 11 A | | | | |
| 23 | 27.5 | .185 | 85.0 | N.E. | 140 | 1.5 | 17 | 6 P | 4:30 P | 12 P | .82 | |
| 24 | 29.0 | .187 | 85.5 | N. | 167 | 3.0 | 24 | 7 A | 0 A | 4 A | .50 | |
| 25 | 27.0 | .165 | 92.0 | N.N.E. | 31 | 0.5 | 10 | 11 P | 6:30 P | 12 P | .33 | ½ |
| 26 | 25.0 | .161 | 86.0 | N. | 347 | 7.0 | 37 | 7 A | 0 A | 5 P | .40 | 2 |
| 27 | 6.5 | .098 | 62.5 | N.N.E. | 268 | 3.5 | 26 | 8 A | | | | |
| 28 | 5.5 | .070 | 84.0 | N.N.W. | 36 | 0.0 | — | — | | | | |
| 29 | 7.0 | .081 | 82.0 | W.N.W. | 11 | 0.0 | — | — | | | | |
| 30 | 21.5 | .130 | 92.5 | N.N.W. | 49 | 1.5 | 17 | 8 P | | | | |
| 31 | 19.0 | .124 | 89.0 | S.W. | 53 | 0.0 | — | — | | | | |

**Rain or melted snow at base of tower. *Included in following day.

# Annual Summary for 1913.

### **Pressure.** In inches.

| | |
|---|---|
| Maximum reduced to freezing, | 30.56, Mar. 18th, 8 A. |
| Minimum reduced to freezing, | 28.25. Jan. 3rd, 6 P. |
| Maximum reduced to freezing and sea-level, | 30.88, Mar. 18th, 8 A. |
| Minimum reduced to freezing and sea-level, | 28.55, Jan. 3rd, 6 P. |
| Mean reduced to freezing and sea-level, | 30.037 |
| Annual range, | 2.33 |

### ***Air Temperature.** In degrees Fahr.

| | |
|---|---|
| Highest, | 100.0, July 1st, 3 P. |
| Lowest, | — 4.5, Feb. 10th, 7:30 A. |
| Mean hourly, | 49.3 |
| Mean of means of max. and min., | 49.6 |
| Mean sensible (wet bulb), | 44.2 |
| Annual range, | 104.5 |
| Highest mean daily, | 81.8, July 1 |
| Lowest mean daily, | 7.1, Feb. 10 |
| Mean maximum, | 60.3 |
| Mean minimum, | 38.9 |
| Mean daily range, | 21.4 |
| Greatest daily range, | 45.0, July 10 |
| Least daily range, | 3.5, Nov. 16 |

### **Humidity.**

| | |
|---|---|
| Mean dew point, | 40.1 |
| Mean force of vapor, | .397 |
| Mean relative humidity, | 75.7 |

### **Wind.**

| | |
|---|---|
| Prevailing direction, | West |

### Summary.

| | |
|---|---|
| Northwest, | 11 per cent. |
| South, | 13 " " |
| North Northwest, | 9 " " |
| Other directions, | 67 " " |
| Total movement, | 55,120 m |
| Greatest daily movement, | 642 m., Jan. 4 |
| Least daily movement, | 9 m., Sept. 5 |
| Mean daily movement, | 151 m |
| Mean hourly velocity, | 6.3 m |

Maximum pressure per square foot, 27.0 lbs.=73 m. per hour, July 23rd, 5 P., S.S.W.

Maximum velocity for 5 minutes, 48 m. per hour, Jan. 3rd, 3 P., S.W.; Mar. 27th, 9 P., W.

### **Precipitation.** In inches.

| | |
|---|---|
| Total precipitation, rain or melted snow, | 39.50 |
| Number of days on which .01 or more rain or melted snow fell, | 135 |
| Snow total in inches, | 26.5 |

### **Weather.**

| | |
|---|---|
| Mean cloudiness observed, | 50 per cent. |
| Total cloudiness recorded by Sun Thermometer, | 2031 hrs.=46 per cent. |
| Number of clear days, | 105 |
| Number of fair days, | 144 |
| Number of cloudy days, | 116 |

### **Bright Sunshine.**

Number of hours recorded, 2423 hrs.=54 per cent

### **Dates of Frosts.**

| | |
|---|---|
| Last, | May 15th |
| First, | Sept. 10th |

### **Dates of Snow.**

| | |
|---|---|
| Last, | April 9th |
| First, | Oct. 31st |
| Total days of sleighing, | 23 |

### **Gales of 50 or More Miles Per Hour.**

Jan. 3d, 60m., S.W.; 4th, 54m., S.W.; 18th, 58m., W.S.W.; Feb. 1st, 52m., W.N.W.; 12th, 50m., W.N.W.; Mar. 20th, 64m, W.N.W.; 31st, 68m, S.W.; Apr. 1st, 58m, W.N.W.; July 23d, 73m, S.S.W.; Oct. 14th, 68m, N.N.E.; Nov. 9th, 53m, S.E. 23d, 54m, N. W.

J. E. OSTRANDER,
*Meteorologist.*

E. K. DEXTER,
*Observer.*

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*Temperature in ground shelter.

BULLETIN No. 301. JANUARY, 1914

# Meteorological Observations
AT THE
# MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.
*Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.*
*Height of Wind Instruments 72 ft.*

## MONTHLY SUMMARY.

### **Pressure.** In inches.

| | |
|---|---|
| Maximum reduced to freezing, | 30.22, 29th, 3 A. |
| Minimum reduced to freezing, | 28.78, 25th, 1 A. |
| Reduced† maximum reading, | 30.53, 29th, 3 A. |
| Reduced† minimum reading, | 29.08, 25th, 1 A. |
| Mean semi-daily reduced, | 29.957 |
| Monthly range, | 1.45 |

### ***Air Temperature.** In Degrees Fahr.

| | |
|---|---|
| Highest, | 52.0, 28th, 4 P. |
| Lowest, | -14.0, 14th, 8 A. |
| Mean hourly, | 22.2 |
| Mean of means of max. and min., | 22.4 |
| Mean sensible (wet bulb), | 19.7 |
| Monthly range, | 66.0 |
| Highest mean daily, | 41.4, 30th |
| Lowest mean daily, | -7.3, 13th |
| Mean maximum, | 31.0 |
| Mean minimum, | 13.8 |
| Mean daily range, | 17.2 |
| Greatest daily range, | 43.0, 23d |
| Least daily range, | 4.0, 20th |

### Humidity.

| | |
|---|---|
| Mean dew point, | 15.8 |
| Mean force of vapor, | .129 |
| Mean relative humidity, | 81.4 |

### **Precipitation.** In inches.

| | |
|---|---|
| Total precipitation, | 3.72 |
| Number of days on which .01 inch or more rain fell, | 14 |
| Total snow in inches | 9.5 |

### Wind.

| | |
|---|---|
| Total movement, | 5442m. |
| Greatest daily movement, | 488m., 13th |
| Least daily movement, | 8m., 16th |
| Mean daily movement, | 176 m |
| Mean hourly velocity, | 7.3 m |

Maximum pressure per square foot, 20.0 lbs. = 63m. per hour, 12th, 3 P., W.N.W.

Maximum velocity for 5 minutes, 38m. per hour, 12th, 2 P., W.N.W.

Prevailing Direction, North Northwest.

### Summary.

| | |
|---|---|
| North | 23 per cent |
| North Northeast | 16 " " |
| South Southwest | 10 " " |
| West | 10 " " |
| Northwest | 16 " " |
| Other directions | 25 " " |

### Weather.

| | |
|---|---|
| Mean cloudiness observed, | 63 per cent. |
| Total cloudiness recorded by the Sun Thermometer, | 199 hrs. = 68 per cent. |
| Number of clear days, | 2 |
| Number of fair days, | 10 |
| Number of cloudy days, | 19 |

### Bright Sunshine.

Number of hours recorded, . . 95 hrs = 32%.

**Rain,** 4th, 8th, 9th, 10th, 24th, 25th, 29th, 31st.

**Snow,** 3d, 4th, 7th, 8th, 10th, 12th, 15th, 16th, 17th, 20th, 21st, 26th, 31st.

**Sleet,** 31st.

**Days of Sleighing,** 14.

**Gales,** 35 or more miles per hour: 46m, 10th, W.S.W.; 63m, 12th, W.N.W; 36m, 17th, N.

Temperature in ground shelter.
Reduced to freezing and sea-level.

# DAILY SUMMARY.

| Day. | Barometer Reduced to Sea Level. | | | Temperature. Ground Shelter. | | | | | | | No. Hours of Bright Sunshine. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Maximun. | Minimum. | Mean. Semi-daily. | Maximum | Time. | Minimum. | Time. | Mean of Max. and Min. | Mean Hourly Draper. | Mean Sensible Wet Bulb. | |
| 1 | 30.27 | 30.11 | 30.233 | 26.0 | 0 A | 9.0 | 12 P | 17.5 | 17.0 | 12.3 | 6.0 |
| 2 | 30.35 | 30.27 | 30.305 | 25.0 | 12 P | 3.0 | 8 A | 14.0 | 15.1 | 13.3 | 0.0 |
| 3 | 30.27 | 29.86 | 30.085 | 32.0 | 8 P | 24.0 | 9:30 A | 28.0 | 28.3 | 27.5 | 0.0 |
| 4 | 29.86 | 29.73 | 29.777 | 35.5 | 12 P | 28.5 | 8:30 A | 32.0 | 32.4 | 30.7 | 0.0 |
| 5 | 30.05 | 29.77 | 29.941 | 38.5 | 5:30 A | 19.0 | 12 P | 28.7 | 30.6 | 25.5 | 0.0 |
| 6 | 30.13 | 29.84 | 30.021 | 32.0 | 3 P | 10.5 | 8 A | 21.3 | 19.5 | 14.3 | 6.6 |
| 7 | 29.84 | 29.63 | 29.707 | 36.5 | 6:30 P | 19.0 | 0 A | 27.7 | 29.0 | 27.3 | 7.0 |
| 8 | 29.68 | 29.56 | 29.624 | 34.0 | 0 A | 29.5 | 6:30 A | 31.7 | 31.7 | 29.7 | 0.0 |
| 9 | 29.57 | 29.23 | 29.398 | 35.0 | 3 P | 29.0 | 4 A | 32.0 | 32.3 | 31.5 | 0.0 |
| 10 | 29.76 | 29.23 | 29.477 | 41.0 | 8:30 A | 21.0 | 12 P | 31.0 | 30.8 | 30.0 | 2.7 |
| 11 | 30.00 | 29.76 | 29.957 | 22.0 | 3 P | 13.5 | 8 A | 17.7 | 17.0 | 11.7 | 7.7 |
| 12 | 29.89 | 29.45 | 29.681 | 29.5 | 11 A | 1.0 | 12 P | 15.3 | 14.7 | 11.7 | 5.3 |
| 13 | 30.27 | 29.82 | 30.089 | 1.0 | 0 A | −11.5 | 12 P | −5.3 | −7.3 | −8.7 | 7.3 |
| 14 | 30.46 | 30.27 | 30.383 | 10.5 | 4 P | −14.0 | 8 A | −1.7 | −3.5 | −6.5 | 7.5 |
| 15 | 30.28 | 29.86 | 30.007 | 18.5 | 8 P | −1.0 | 0 A | 8.7 | 8.3 | 9.7 | 0.0 |
| 16 | 29.87 | 29.55 | 29.743 | 24.5 | 5 P | 5.5 | 8 A | 15.0 | 17.0 | 13.7 | 0.0 |
| 17 | 29.92 | 29.54 | 29.729 | 35.5 | 2:30 P | 22.0 | 12 P | 28.7 | 27.3 | 24.0 | 3.0 |
| 18 | 30.17 | 29.92 | 30.159 | 27.5 | 3 P | 6.0 | 12 P | 16.7 | 16.3 | 11.3 | 8.1 |
| 19 | 30.13 | 29.64 | 29.873 | 30.0 | 9 P | 4.5 | 7:30 A | 17.3 | 17.8 | 16.3 | 3.3 |
| 20 | 29.67 | 29.61 | 29.661 | 29.5 | 2:30 P | 25.5 | 5:30 A | 27.5 | 27.4 | 26.3 | 0.0 |
| 21 | 29.67 | 29.35 | 29.476 | 28.0 | 0 A | 12.0 | 12 P | 20.0 | 23.0 | 20.3 | 2.2 |
| 22 | 30.23 | 29.67 | 30.097 | 26.0 | 3:30 P | 1.5 | 7:30 A | 13.7 | 12.6 | 7.3 | 7.7 |
| 23 | 30.38 | 29.96 | 30.211 | 31.0 | 12 P | −12.0 | 7:30 A | 9.5 | 11.3 | 6.3 | 5.0 |
| 24 | 29.96 | 29.12 | 30.027 | 44.5 | 7 P | 31.0 | 0 A | 37.7 | 38.7 | 38.0 | 0.0 |
| 25 | 30.30 | 29.08 | 29.871 | 42.0 | 1 A | 8.0 | 12 P | 25.0 | 23.9 | 19.3 | 7.0 |
| 26 | 30.39 | 30.28 | 30.338 | 17.0 | 4 P | 6.5 | 6 A | 11.7 | 9.8 | 8.5 | 0.7 |
| 27 | 30.40 | 30.07 | 30.231 | 35.5 | 12 P | 11.0 | 0 A | 23.3 | 20.4 | 21.5 | 0.0 |
| 28 | 30.46 | 30.03 | 30.255 | 52.0 | 4 P | 33.5 | 12 P | 42.7 | 38.9 | 34.5 | 6.3 |
| 29 | 30.53 | 30.20 | 30.380 | 39.0 | 12 P | 31.0 | 2 A | 35.3 | 35.3 | 35.3 | 0.0 |
| 30 | 30.20 | 30.01 | 30.078 | 48.5 | 11 A | 34.5 | 12 P | 41.5 | 41.4 | 37.0 | 1.3 |
| 31 | 30.21 | 29.54 | 29.863 | 34.5 | 5 P | 28.0 | 8:30 A | 31.3 | 31.9 | 30.0 | 0.0 |

# DAILY SUMMARY.

| | Humidity. | | | Wind. | | | | | Precipitation. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Total in Inches. | |
| Day. | Mean Dew Point. | Mean Force vapor. | Mean Relative Humidity. | Prevailing Direction. | Total Movement in Miles. | Maximum Pressure Per Square Ft | Miles per Hour. | Time. | Beginning. | Ending. | Rain.** | Snow. |
| 1 | 10.0 | .081 | 88.0 | N. | 216 | 3.0 | 24 | 9 A | | | | |
| 2 | 10.0 | .093 | 85.5 | N. | 146 | 1.5 | 17 | 1 P | | | | |
| 3 | 25.5 | .157 | 89.0 | N. | 218 | 4.0 | 28 | 5 P | 1 P | 12 P | T | T |
| 4 | 28.5 | .180 | 87.5 | N.N.E. | 366 | 4.5 | 30 | 1 A | 0 A | 10 P | .03 | T |
| 5 | 19.0 | .155 | 71.5 | N.N.E. | 340 | 5.0 | 32 | 2 P | | | | |
| 6 | 9.5 | .094 | 76.5 | E.N.E. | 95 | 0.0 | — | — | | | | |
| 7 | 23.0 | .167 | 77.5 | S.W. | 127 | 0.0 | — | — | 4 A | 5 A | T | T |
| 8 | 25.5 | .178 | 77.0 | S.S.W. | 130 | 0.0 | — | — | 9 A | 9 P | .02 | ½ |
| 9 | 30.0 | .181 | 95.0 | N.N.E. | 56 | 0.0 | — | — | 4 P | 12 P | .02 | |
| 10 | 25.5 | .180 | 76.0 | W. | 256 | 10.5 | 46 | 3 P | 0 A | 5 A | .01 | T |
| 11 | 4.5 | .084 | 67.0 | N.N.W. | 288 | 2.5 | 22 | 6 A | | | | |
| 12 | 3.5 | .089 | 62.5 | S.W. | 382 | 20.0 | 63 | 3 P | 3 A | 6 P | T | T |
| 13 | −17.5 | .031 | 60.0 | N.W. | 488 | 5.5 | 33 | 8 A | | | | |
| 14 | −12.0 | .037 | 76.0 | N. | 167 | 0.5 | 10 | 2 A | | | | |
| 15 | 5.5 | .077 | 79.5 | N. | 17 | 0.0 | — | — | 10 A | 8 P | .07 | ¾ |
| 16 | 12.0 | .091 | 91.5 | N.W. | 8 | 0.0 | — | — | 7 P | 12 P | .09 | 1 |
| 17 | 21.0 | .137 | 85.0 | N.N.E. | 217 | 6.5 | 36 | 8 P | 0 A | 9 A | .06 | ½ |
| 18 | 5.0 | .081 | 69.5 | N. | 302 | 2.5 | 22 | 2 A | | | | |
| 19 | 14.5 | .107 | 89.5 | S.S.E. | 77 | 0.0 | — | — | | | | |
| 20 | 23.5 | .148 | 88.5 | N.E. | 43 | 0.0 | — | — | 0 A | 12 P | .32 | 2¼ |
| 21 | 16.5 | .117 | 82.5 | N.N.E. | 146 | 2.5 | 22 | 11 P | 0 A | 8 P | .28 | 2¼ |
| 22 | 4.0 | .067 | 83.0 | N.W. | 197 | 3.5 | 26 | 1 A | | | | |
| 23 | −1.0 | .085 | 67.5 | S.S.W. | 27 | 0.0 | — | — | | | | |
| 24 | 36.5 | .238 | 91.5 | S.S.W. | 230 | 2.0 | 20 | 1 P | 8 A | 12 P | .75 | |
| 25 | 13.5 | .125 | 71.5 | N.N.W. | 321 | 5.0 | 32 | 9 A | 0 A | 5 A | .05 | |
| 26 | 7.0 | .069 | 91.5 | N.W. | 44 | 0.0 | — | — | 10 A | 3 P | .16 | 2 |
| 27 | 20.0 | .123 | 94.5 | N.W. | 21 | 0.0 | — | — | | | | |
| 28 | 30.5 | .212 | 82.5 | W. | 89 | 0.0 | — | — | | | | |
| 29 | 34.0 | .210 | 93.0 | S.S.E. | 61 | 0.0 | — | — | 2 P | 11 P | .06 | |
| 30 | 33.0 | .242 | 80.0 | W. | 196 | 3.0 | 24 | 6 P | | | | |
| 31 | 28.0 | .173 | 92.0 | N. | 171 | 0.0 | — | — | 4 A | 9 P | 1.80 | ¼ |

**Rain or melted snow at base of tower. *Included in following day.

# REMARKS

The weather during January was generally seasonable and showed a number of rapid changes in temperature, which often characterizes this time of year. The changes in atmospheric pressure were also large and comparatively rapid. The amount of cloudiness was unusually large, especially when taken in connection with the precipitation up to the last day of the month. The heavy storm of rain, sleet and snow on the last day of the month furnished practically one-half of the total precipitation record.

Comparing the records of the several weather elements with the normals here shows the following as the principal features. The mean barometer was much less than the normal and the maximum and minimum pressures were both well below the average records for these features. The rapid fall in pressure on the 24th and more rapid rise of more than one inch on the 25th made a very unusual record on the pressure chart. While the wind movement on those dates was large, it at no time became even a moderate gale. The total wind movement was about ten per cent more than the normal, and about one-fourth of the days showed a comparatively large daily movement.

The mean temperature was slightly less than the normal, and the maximum nearly the average value for that feature. The minimum was more than five degrees below its normal value, giving an unusually large range for the month. On the 13th the thermometer was below zero for practically the whole day ; the mean hourly temperature being –7.3 degrees. On the following day it also averaged below zero, although considerably above during part of the day.

The mean dewpoint was rather low and the relative humidity considerably above the normal.

The total precipitation was about ten per cent more than the normal, and much the greater part occurred as rain. The snowfall was comparatively small. The sky was cloudy or overcast about two-thirds of the time.

J. E. OSTRANDER, Meteorologist

E. K. DEXTER, Observer.

BULLETIN No. 302. FEBRUARY, 1914

# Meteorological Observations
AT THE
# MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.
*Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.*
*Height of Wind Instruments 72 ft.*

## MONTHLY SUMMARY.

### **Pressure.** In inches.

| | |
|---|---|
| Maximum reduced to freezing, | 30.34, 13th, 8 A. |
| Minimum reduced to freezing, | 28.86, 14th, 3 P. |
| Reduced† maximum reading, | 30.68, 13th, 8 A. |
| Reduced† minimum reading, | 29.18, 14th, 3 P. |
| Mean semi-daily reduced, | 30.132 |
| Monthly range, | 1.50 |

### ***Air Temperature.** In Degrees Fahr.

| | |
|---|---|
| Highest, | 46.5, 27th, 4 P. |
| Lowest, | -17.5, 16th, 4 A. |
| Mean hourly, | 17.7 |
| Mean of means of max. and min., | 17.9 |
| Mean sensible (wet bulb), | 14.1 |
| Monthly range, | 64.0 |
| Highest mean daily, | 36.6, 4th |
| Lowest mean daily, | -6.7, 12th |
| Mean maximum, | 28.2 |
| Mean minimum, | 7.7 |
| Mean daily range, | 20.5 |
| Greatest daily range, | 45.0, 25th |
| Least daily range, | 6.0, 19th |

### **Humidity.**

| | |
|---|---|
| Mean dew point, | 7.9 |
| Mean force of vapor, | .106 |
| Mean relative humidity, | 72.0 |

### **Precipitation.** In inches.

| | |
|---|---|
| Total precipitation, | 3.36 |
| Number of days on which .01 inch or more rain fell, | 8 |
| Total snow in inches | 24.5 |

### **Wind.**

| | |
|---|---|
| Total movement, | 5855m. |
| Greatest daily movement, | 462m., 8th |
| Least daily movement, | 43m., 18th |
| Mean daily movement, | 209 m |
| Mean hourly velocity, | 8.7 m |

Maximum pressure per square foot, 12.5 lbs.= 50m. per hour, 14th, 3P., N.N.W.

Maximum velocity for 5 minutes, 39m. per hour, 14th, 3P., N.N.W.

Prevailing Direction, Northwest.

### Summary.

| | |
|---|---|
| North | 25 per cent |
| West Northwest | 18 " " |
| North Northwest | 14 " " |
| North Northeast | 11 " " |
| South Southwest | 11 " " |
| West | 11 " " |
| Other directions | 10 " " |

### **Weather.**

| | |
|---|---|
| Mean cloudiness observed, | 42 per cent. |
| Total cloudiness recorded by the Sun Thermometer, | 118 hrs.=40 per cent. |
| Number of clear days, | 12 |
| Number of fair days, | 8 |
| Number of cloudy days, | 8 |

### **Bright Sunshine.**

Number of hours recorded, . . 178 hrs=60%.

**Rain**, 3d, 4th, 7th.

**Snow**, 3d, 6th, 7th, 13th, 14th, 16th, 17th, 19th, 22d.

**Days of Sleighing**, 15.

**Gales**, 35 or more miles per hour: 44m, 7th, W.; 41m, 8th, W.; 50m, 14th, N.N.W.; 35m, 24th, N.

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* Temperature in ground shelter.

† Reduced to freezing and sea-level.

# DAILY SUMMARY.

| Day. | Barometer Reduced to Sea Level. |  |  | Temperature. Ground Shelter. |  |  |  |  |  |  | No. Hours of Bright Sunshine. |
|---|---|---|---|---|---|---|---|---|---|---|---|
|  | Maximun. | Minimum. | Mean. Semi-daily. | Maximum | Time. | Minimum. | Time. | Mean of Max. and Min. | Mean Hourly Draper. | Mean Sensible Wet Bulb. |  |
| 1 | 30.13 | 29.56 | 29.881 | 40.0 | 1:30 P | 32.0 | 0 A | 36.0 | 35.7 | 30 7 | 5.0 |
| 2 | 30.50 | 30.13 | 30.429 | 38.0 | 3:30 P | 27.0 | 8 A | 32.5 | 29.3 | 24.7 | 8.8 |
| 3 | 30.46 | 30.13 | 30.289 | 45.5 | 3 P | 18.0 | 7:30 A | 31.7 | 31.3 | 28.5 | 1.7 |
| 4 | 30.13 | 29.92 | 30.000 | 43.5 | 2 P | 29.0 | 12 P | 36.3 | 36 6 | 32.7 | 6.0 |
| 5 | 30.33 | 30.07 | 30.203 | 37.5 | 3 P | 23.0 | 12 P | 30.3 | 28.5 | 23.5 | 3.5 |
| 6 | 30.46 | 29 83 | 30.256 | 31.0 | 12 P | 15.0 | 7 A | 23.0 | 23.5 | 21.5 | 0.2 |
| 7 | 29 83 | 29.30 | 29.501 | 34.5 | 7:30 P | 27 0 | 12 P | 30.7 | 29.4 | 28.5 | 1.5 |
| 8 | 30.08 | 29.65 | 29.959 | 27.0 | 0 A | 17.0 | 12 P | 22.0 | 22.3 | 18.3 | 8.2 |
| 9 | 30.33 | 30.08 | 30.305 | 20.0 | 3 P | 9.0 | 7:30 A | 14.5 | 14.2 | 9.5 | 9 3 |
| 10 | 30.26 | 30.15 | 30.221 | 24 0 | 2:30 P | 13.0 | 12 P | 18 5 | 18.3 | 15.3 | 8.3 |
| 11 | 30.35 | 30.18 | 30.289 | 13.0 | 0 A | −8.0 | 12 P | 2.5 | 3.7 | −2.0 | 7.9 |
| 12 | 30.62 | 30 35 | 30.514 | 2.5 | 4 P | −13.0 | 7:30 A | −5.3 | −6.7 | −8.7 | 9.5 |
| 13 | 30.68 | 30.32 | 30.571 | 17.0 | 10:30 P | −10.0 | 7:30 A | 3.5 | 3.5 | 1.0 | 9.0 |
| 14 | 30.32 | 29.18 | 29.645 | 29.5 | 4:30 P | 10.5 | 3:30 A | 20.0 | 18.4 | 16.3 | 0.0 |
| 15 | 30.07 | 29.74 | 30.013 | 17.5 | 0 A | -9.0 | 12 P | 4.3 | 8.0 | 1.7 | 9.7 |
| 16 | 30.07 | 29.68 | 29.877 | 11.0 | 11 P | −17.5 | 4 A | −3.3 | −2.1 | −0.7 | 1.2 |
| 17 | 30.04 | 29.83 | 30.007 | 20.0 | 3:30 P | −1.5 | 5 A | 9.3 | 11.1 | 10.3 | 8 6 |
| 18 | 30.22 | 30.02 | 30.139 | 26.5 | 3 P | −7.5 | 7:30 A | 9 5 | 11.0 | 8.3 | 5.5 |
| 19 | 30.02 | 29 85 | 29.944 | 26.5 | 4:30 P | 20 5 | 6 A | 23.5 | 22.7 | 22.3 | 0.3 |
| 20 | 30.20 | 30.00 | 30.133 | 22.5 | 3 P | 12.0 | 12 P | 17.3 | 17.5 | 13.5 | 7.1 |
| 21 | 30.20 | 30.06 | 30.190 | 31.0 | 3:30 P | 7.5 | 7 A | 19.3 | 13.2 | 7.3 | 8.5 |
| 22 | 30.19 | 29 80 | 29.986 | 31.0 | 4 P | −1.5 | 3:30 A | 14 7 | 17 5 | 17.5 | 1.5 |
| 23 | 30.27 | 30.02 | 30.248 | 19.0 | 3 P | 3.0 | 12 P | 11.0 | 11.6 | 6.0 | 8.0 |
| 24 | 30.45 | 30.24 | 30.391 | 15.5 | 4 P | −3.0 | 7 A | 6.3 | 3 5 | −1.3 | 10.1 |
| 25 | 30.52 | 30.30 | 30.435 | 32.5 | 3:30 P | −12.5 | 7 A | 10 0 | 8 5 | 4.3 | 10.1 |
| 26 | 30.30 | 30.11 | 30.195 | 40 5 | 4 P | --0 5 | 7 A | 20.0 | 20.2 | 13.5 | 9.9 |
| 27 | 30 11 | 30.04 | 30.099 | 46.5 | 4 P | 23.5 | 6:30 A | 35.0 | 33.3 | 27.0 | 10 0 |
| 28 | 30.11 | 29.80 | 29.977 | 46 0 | 3 P | 12.5 | 7 A | 29.3 | 31.1 | 25.7 | 8 5 |

# DAILY SUMMARY.

| Day. | Humidity. | | | Wind. | | | | | Precipitation. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Total in Inches. | |
| | Mean Dew Point. | Mean Force vapor. | Mean Relative Humidity. | Prevailing Direction. | Total Movement in Miles. | Maximum Pressure Per Square Ft | Miles per Hour. | Time. | Beginning. | Ending. | Rain.** | Snow. |
| 1 | 21.5 | .203 | 59.0 | W.N.W. | 316 | 5.5 | 33 | 1 P | | | | |
| 2 | 18.5 | .143 | 71.5 | N.N.W. | 247 | 2.5 | 22 | 2 A | | | | |
| 3 | 25.0 | .180 | 83.0 | E. | 70 | 0.0 | — | — | 12 M | 12 P | .08 | T |
| 4 | 28.5 | .201 | 80.0 | W.N.W. | 146 | 2.0 | 20 | 2 P | 0 A | 6 A | .02 | |
| 5 | 15.0 | .145 | 62.5 | N. | 136 | 0.5 | 10 | 9 A | | | | |
| 6 | 18.5 | .127 | 86.0 | N.N.E. | 157 | 1.0 | 14 | 9 A | 4 P | 12 P | .20 | 1¼ |
| 7 | 25.0 | .170 | 82.5 | N. | 140 | 9.5 | 44 | 10 P | 0 A | 3 P | .31 | ¼ |
| 8 | 14.0 | .109 | 76.0 | W. | 462 | 8.5 | 41 | 5 A | | | | |
| 9 | −1.0 | .077 | 56.5 | W. | 324 | 2.0 | 20 | 3 A | | | | |
| 10 | 5.0 | .101 | 58.5 | W.N.W. | 268 | 1.5 | 17 | 1 P | | | | |
| 11 | −12.0 | .045 | 57.0 | N.N.W. | 287 | 3.5 | 26 | 7 P | | | | |
| 12 | −18.0 | .031 | 59.0 | N.W. | 332 | 4.0 | 28 | 3 P | | | | |
| 13 | −2.5 | .056 | 80.0 | N.N.W. | 141 | 0.0 | — | — | 10 P | 12 P | .06 | ¾ |
| 14 | 11.5 | .099 | 81.0 | N. | 365 | 12.5 | 50 | 3 P | 0 A | 6 P | 1.95 | 15¾ |
| 15 | −1.0 | .052 | 83.5 | N. | 311 | 5.0 | 32 | 1 A | | | | |
| 16 | −5.0 | .049 | 80.0 | N.N.W. | 133 | 2.0 | 20 | 11 P | 12 M | 8 P | .24 | 1 |
| 17 | 6.0 | .076 | 80.5 | W.N.W. | 209 | 3.0 | 24 | 1 P | 7 P | | T | T |
| 18 | 3.5 | .081 | 76.5 | W. | 43 | 0.0 | — | — | | | | |
| 19 | 20.5 | .123 | 93.5 | N. | 102 | 0.0 | — | — | 1 A | 9 P | .50 | 5½ |
| 20 | 9.0 | .087 | 77.5 | N. | 233 | 1.5 | 17 | 7 P | | | | |
| 21 | −3.5 | .070 | 54.5 | N.N.E. | 174 | 2.0 | 20 | 4 A | | | | |
| 22 | 13.5 | .107 | 79.0 | S.S.W. | 271 | 4.0 | 28 | 9 P | 2 P | | T | T |
| 23 | −6.5 | .066 | 52.5 | N.N.E. | 299 | 4.5 | 30 | 10 P | | | | |
| 24 | −8.0 | .043 | 70.0 | N. | 390 | 6.0 | 35 | 4 A | | | | |
| 25 | −3.5 | .065 | 64.0 | W.N.W. | 57 | 0.0 | — | — | | | | |
| 26 | 7.5 | .102 | 73.5 | S.S.W. | 65 | 0.0 | — | — | | | | |
| 27 | 21.5 | .173 | 69.0 | S.S.W. | 86 | 0.0 | — | — | | | | |
| 28 | 19.5 | .175 | 69.5 | S. | 91 | 0.5 | 10 | 5 P | | | | |

**Rain or melted snow at base of tower. *Included in following day.

# REMARKS

The weather during February was marked by much more than the usual amount of extreme cold—the temperature going below zero on eleven days—and large fluctuations in the barometer's records. The interval between the maximum and minimum barometer for the month was only about thirty hours, and the fall of more than one inch in twelve hours on the 14th showed a change in pressure seldom equalled for rapidity here. Accompanying this change in pressure was one of the most severe snow-storms of recent years. The first week of the month was much more nearly normal than any other part.

The records of the several weather elements show the following as the more important features: The mean barometer was nearly a tenth of an inch higher than the normal and the fluctuations in pressure were generally large. The maximum, minimum and range of pressure were practically normal. The total wind movement was about a thousand miles more than usual—more than one-third of the days showing a large daily movement. Nearly three-fourths of the wind was from the northerly points of the compass.

The mean temperature was nearly seven degrees below the normal, making it one of the coldest months since this station was established. Owing to the low minimum of the month the range was considerably larger than usual. On the 12th and 16th the mean hourly temperature was below zero.

The total precipitation was slightly more than the normal; more than two inches resulting from the severe snow-storm of the 13th-14th. Nearly all of the precipitation was in the form of snow.

The mean dew point was extremely low and the relative humidity was much lower than usual. The amount of sunshine was considerably more than the normal. Sleighing began on the 14th and continued throughout the remainder of the month.

J. E. OSTRANDER, Meteorologist

E. K. DEXTER, Observer.

BULLETIN No. 303. MARCH, 1914

# Meteorological Observations
AT THE
# MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.
*Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.*
*Height of Wind Instruments 72 ft.*

## MONTHLY SUMMARY.

### Pressure. In inches.

| | |
|---|---|
| Maximum reduced to freezing, | 30.26, 25th, 9 A. |
| Minimum reduced to freezing, | 28.17, 1st, 8 P. |
| Reduced† maximum reading, | 30.57, 25th, 9 A. |
| Reduced† minimum reading, | 28.47, 1st, 8 P. |
| Mean semi-daily reduced, | 29.997 |
| Monthly range, | 2.10 |

### *Air Temperature. In Degrees Fahr.

| | |
|---|---|
| Highest, | 69.0, 27th, 3 P. |
| Lowest, | 8.5, 21st, 5:30A. |
| Mean hourly, | 32.7 |
| Mean of means of max. and min., | 33.7 |
| Mean sensible (wet bulb), | 29.6 |
| Monthly range, | 60.5 |
| Highest mean daily, | 53.9, 27th |
| Lowest mean daily, | 18.8, 20th |
| Mean maximum, | 41.9 |
| Mean minimum, | 25.5 |
| Mean daily range, | 16.4 |
| Greatest daily range, | 26.5, 16th, 25th |
| Least daily range, | 4.0, 6th |

### Humidity.

| | |
|---|---|
| Mean dew point, | 24.8 |
| Mean force of vapor, | 185 |
| Mean relative humidity, | 76.4 |

### Precipitation. In inches.

| | |
|---|---|
| Total precipitation, | 5.52 |
| Number of days on which .01 inch or more rain fell | 11 |
| Total snow in inches | 6.25 |

### Wind.

| | |
|---|---|
| Total movement, | 5663m. |
| Greatest daily movement, | 438m., 19th |
| Least daily movement, | 44m., 22d |
| Mean daily movement, | 183 m |
| Mean hourly velocity, | 7.6 m |

Maximum pressure per square foot, 30.0 lbs.= 77m. per hour, 1st, 6P., E.

Maximum velocity for 5 minutes, 45m. per hour, 1st, 6P., E.

Prevailing Direction, Northwest.

### Summary.

| | |
|---|---|
| North Northwest | 16 per cent |
| West Northwest | 13 " " |
| North | 13 " " |
| North Northeast | 10 " " |
| Southwest | 10 " " |
| Other directions | 38 " " |

### Weather.

| | |
|---|---|
| Mean cloudiness observed, | 53 per cent. |
| Total cloudiness recorded by the Sun Thermometer, | 201 hrs.=54 per cent. |
| Number of clear days, | 4 |
| Number of fair days, | 15 |
| Number of cloudy days, | 12 |

### Bright Sunshine.

Number of hours recorded, . . 170 hrs=46%.

**Rain,** 1st, 2d, 3d, 4th, 6th, 7th, 8th, 17th, 18th, 26th, 27th, 28th, 29th, 30th.

**Snow,** 1st, 2d, 4th, 6th, 7th, 9th, 18th, 22d, 23d, 28th, 29th.

**Hail,** 18th, 28th.

**Gales,** 35 or more miles per hour: 77m, 1st, E.; 37m, 3d, N.N.W.; 52m, 19th, W.N.W.

---

*Temperature in ground shelter.

† Reduced to freezing and sea-level.

# DAILY SUMMARY.

| Day. | Barometer Reduced to Sea Level. |  |  | Temperature. Ground Shelter. |  |  |  |  |  |  | No. Hours of Bright Sunshine. |
|---|---|---|---|---|---|---|---|---|---|---|---|
|  | Maximun. | Minimum. | Mean. Semi-daily. | Maximum | Time. | Minimum. | Time. | Mean of Max. and Min. | Mean Hourly Draper. | Mean Sensible Wet Bulb. |  |
| 1 | 29.80 | 28.47 | 28.969 | 45.5 | 7 P | 28.5 | 4:30 A | 37.0 | 36.2 | 37.3 | 0.0 |
| 2 | 29.25 | 28.60 | 29.110 | 40.5 | 4 P | 32.5 | 7 A | 36.5 | 35.7 | 33.3 | 0.2 |
| 3 | 29.57 | 29.25 | 29.413 | 46.0 | 1 P | 32.0 | 1 A | 39.0 | 38.4 | 35.0 | 3.3 |
| 4 | 29.90 | 29.57 | 29.749 | 38.0 | 12 M | 28.5 | 7 A | 33.3 | 33.4 | 29.0 | 0.9 |
| 5 | 30.07 | 29.90 | 30.042 | 44.5 | 4:30 P | 28.0 | 7:30 A | 36.3 | 33.5 | 27.7 | 8.7 |
| 6 | 30.06 | 29.73 | 29.883 | 34.0 | 9 A | 30.0 | 12 P | 32.0 | 32.0 | 30.3 | 0.0 |
| 7 | 29.74 | 29.60 | 29.672 | 37.5 | 2:30 P | 28.5 | 7 A | 33.0 | 32.5 | 30.5 | 3.9 |
| 8 | 29.78 | 29.66 | 29.712 | 37.5 | 0:30 P | 27.5 | 12 P | 32.5 | 32.7 | 29.5 | 1.6 |
| 9 | 29.91 | 29.77 | 29.829 | 31.5 | 2 P | 21.0 | 12 P | 26.3 | 26.3 | 22.7 | 5.0 |
| 10 | 30.12 | 29.91 | 30.058 | 32.5 | 4 P | 18.0 | 7:30 A | 25.3 | 23.9 | 20.5 | 9.6 |
| 11 | 30.14 | 30.03 | 30.134 | 34.0 | 4:30 P | 16.0 | 6 A | 25.0 | 24.7 | 22.0 | 10.0 |
| 12 | 30.24 | 30.07 | 30.163 | 35.5 | 3 P | 11.5 | 7 A | 23.5 | 23.6 | 19.5 | 10.2 |
| 13 | 30.27 | 30.05 | 30.163 | 37.5 | 3:30 P | 13.5 | 7 A | 25.5 | 24.7 | 20.5 | 8.8 |
| 14 | 30.33 | 30.05 | 30.196 | 41.0 | 3 P | 16.5 | 6:30 A | 28.7 | 30.4 | 28.5 | 6.5 |
| 15 | 30.19 | 30.01 | 30.087 | 53.0 | 3:30 P | 32.0 | 12 P | 42.5 | 39.6 | 33.0 | 6.5 |
| 16 | 30.18 | 30.05 | 30.129 | 55.0 | 3:30 P | 28.5 | 7 A | 41.7 | 40.4 | 36.7 | 8.8 |
| 17 | 30.05 | 29.90 | 29.990 | 53.0 | 4 P | 31.0 | 12 P | 42.0 | 38.3 | 35.0 | 6.1 |
| 18 | 29.90 | 29.42 | 29.648 | 35.5 | 8 A | 30.5 | 2 A | 33.0 | 32.5 | 33.0 | 0.0 |
| 19 | 30.06 | 29.54 | 29.922 | 33.5 | 0 A | 20.0 | 12 P | 26.7 | 26.6 | 22.0 | 8.3 |
| 20 | 30.36 | 30.01 | 30.173 | 27.5 | 2:30 P | 13.0 | 12 P | 20.3 | 18.8 | 14.5 | 7.5 |
| 21 | 30.45 | 30.26 | 30.383 | 33.5 | 2:30 P | 8.5 | 5:30 A | 21.0 | 20.7 | 18.0 | 9.5 |
| 22 | 30.26 | 29.86 | 29.993 | 35.5 | 4 P | 21.5 | 6 A | 28.5 | 25.8 | 22.7 | 5.5 |
| 23 | 30.10 | 29.89 | 30.018 | 39.0 | 1:30 P | 20.5 | 3:30 A | 29.7 | 28.8 | 25.7 | 4.2 |
| 24 | 30.45 | 30.10 | 30.330 | 43.5 | 3:30 P | 22.0 | 5 A | 32.7 | 31.2 | 26.3 | 9.2 |
| 25 | 30.57 | 30.43 | 30.561 | 49.0 | 3 P | 22.5 | 6:30 A | 35.7 | 35.8 | 30.7 | 8.7 |
| 26 | 30.43 | 30.21 | 30.300 | 62.5 | 3:30 P | 37.5 | 1:30 A | 50.0 | 48.5 | 46.3 | 7.8 |
| 27 | 30.21 | 30.05 | 30.125 | 69.0 | 3 P | 45.0 | 2 A | 57.0 | 53.9 | 52.3 | 7.4 |
| 28 | 30.36 | 30.13 | 30.289 | 46.0 | 0 A | 33.0 | 9:30 P | 39.5 | 37.0 | 35.7 | 0.0 |
| 29 | 30.42 | 30.33 | 30.397 | 37.5 | 4 P | 32.0 | 12 P | 34.7 | 34.5 | 32.3 | 0.0 |
| 30 | 30.33 | 29.97 | 30.079 | 35.0 | 0:30 P | 30.0 | 6 A | 32.5 | 32.4 | 32.0 | 0.0 |
| 31 | 30.45 | 30.05 | 30.401 | 54.5 | 5 P | 32.0 | 0 A | 43.3 | 41.3 | 35.7 | 11.4 |

# DAILY SUMMARY.

| Day. | Humidity. | | | Wind. | | | | | Precipitation. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Mean Dew Point. | Mean Force vapor. | Mean Relative Humidity. | Prevailing Direction. | Total Movement in Miles. | Maximum Pressure Per Square Ft | Miles per Hour. | Time. | Beginning. | Ending. | Total in Inches. Rain.** | Total in Inches. Snow. |
| 1 | 35.5 | .239 | 89.5 | N.N.E. | 279 | 30.0 | 77 | 6 P | 1 A | 11 P | 2.59 | 2¼ |
| 2 | 29.5 | .205 | 81.5 | N.E. | 264 | 2.5 | 22 | 5 A | 8 A | 4 P | T | T |
| 3 | 29.0 | .234 | 70.5 | N.N.W. | 331 | 7.0 | 37 | 12 M | 3 A | 5 A | .02 | |
| 4 | 22.5 | .184 | 66.0 | W.N.W. | 170 | 2.0 | 20 | 1 A | 2 P | | T | T |
| 5 | 21.5 | .171 | 68.5 | N.N.W. | 181 | 0.5 | 10 | 7 A | | | | |
| 6 | 26.5 | .183 | 78.0 | N.N.E. | 185 | 2.5 | 22 | 7 P | 9 A | 12 P | .19 | ¾ |
| 7 | 28.0 | .177 | 90.0 | S.W. | 120 | 0.5 | 10 | 7 P | 0 A | 12 P | .11 | ¾ |
| 8 | 25.0 | .177 | 77.0 | W.S.W. | 172 | 0.0 | — | — | 0 A | 3 A | T | |
| 9 | 17.0 | .137 | 72.5 | W.N.W. | 206 | 3.5 | 26 | 3 P | 8 A | | T | T |
| 10 | 12.5 | .125 | 67.5 | N.W. | 251 | 3.0 | 24 | 6 P | | | | |
| 11 | 14.0 | .136 | 63.0 | N.N.W. | 147 | 1.0 | 14 | 2 P | | | | |
| 12 | 9.5 | .126 | 55.0 | N.N.W. | 98 | 0.5 | 10 | 4 A | | | | |
| 13 | 15.5 | .125 | 75.5 | N.N.W. | 66 | 1.0 | 14 | 8 P | | | | |
| 14 | 21.5 | .173 | 69.5 | S. | 232 | 4.0 | 28 | 6 P | | | | |
| 15 | 28.0 | .211 | 73.0 | W. | 192 | 1.0 | 14 | 3 A | | | | |
| 16 | 34.5 | .235 | 86.5 | S.S.E. | 109 | 0.0 | — | — | | | | |
| 17 | 32.0 | .220 | 82.5 | N. | 79 | 1.5 | 17 | 4 P | 5 A | 10 A | .16 | |
| 18 | 30.5 | .197 | 88.0 | N. | 115 | 0.0 | — | — | 7 A | 6 P | .67 | 2¼ |
| 19 | 16.0 | .131 | 71.5 | W.N.W. | 438 | 13.5 | 52 | 7 A | | | | |
| 20 | 6.5 | .095 | 64.0 | N.W. | 308 | 4.0 | 28 | 4 P | | | | |
| 21 | 7.5 | .116 | 57.5 | W.N.W. | 130 | 1.0 | 14 | 1 A | | | | |
| 22 | 16.5 | .136 | 69.0 | W. | 44 | 0.0 | — | — | 10 A | | T | T |
| 23 | 21.5 | .150 | 80.0 | S.W. | 131 | 0.5 | 10 | 4 P | 2 P | 4 P | T | T |
| 24 | 22.5 | .160 | 75.5 | S.S.W. | 60 | 0.0 | — | — | | | | |
| 25 | 26.5 | .194 | 76.0 | S.S.W. | 133 | 0.5 | 10 | 7 P | | | | |
| 26 | 45.0 | .332 | 91.0 | S. | 249 | 0.0 | — | — | 0 A | 6 A | .12 | |
| 27 | 50.5 | .415 | 90.5 | S.W. | 167 | 2.0 | 20 | 10 P | 3 A | 12 P | .40 | |
| 28 | 34.0 | .175 | 93.5 | N.N.E. | 200 | 1.0 | 14 | 11 A | 0 A | 12 P | 1.21 | ¼ |
| 29 | 29.5 | .152 | 85.5 | N.E. | 248 | 2.0 | 20 | 9 A | 0 A | 12 P | .02 | T |
| 30 | 30.0 | .187 | 92.5 | N. | 149 | 0.0 | — | — | 0 A | 11 P | .03 | |
| 31 | 29.5 | .243 | 69.0 | N. | 209 | 3.0 | 24 | 3 A | | | | |

**Rain or melted snow at base of tower. *Included in following day.

## REMARKS

The first day of the month was marked by an unusually rapid fall of the barometer, accompanied by an extremely heavy rainstorm and excessive wind velocity. The barometer fell from 29.50 at 0 A. M. to 28.17 at 8 P. M., and the record passed entirely off the chart and unsealed the mercury column and put the self-recording barometer out of commission. At 6 P. M. the pressure chart showed a velocity of wind of 77 miles per hour, and the anemometer showed 45 miles per hour for a considerable time. The Draper barometer was broken as a result of the storm, and the maximum and minimum pressures for the first 18 days of the month were taken from barograph records taken by Professor Todd, and reduced by comparing them with our standard barometer readings in the tower. The minimum barometer reading on the 1st reduced to freezing and sea level was 28.47—the lowest record since the station was established 25 years ago. A large precipitation and much cloudiness were the most noticeable features of the weather for the month.

A comparison of the records of the several weather elements with the normals for this station shows the following features of interest: The mean barometer was slightly below the normal and the range exceeded the normal range for a whole year. The maximum pressure was slightly lower than the average value of this feature for March. The total wind movement was practically normal, with much from the Northwest quadrant.

The mean temperature was slightly below the normal value and the range greater than usual, owing to a rather high maximum for the month.

The mean dew point was slightly lower than the normal and the mean relative humidity about two points higher than usual.

The total precipitation was about one and one-half inches more than the normal, and several heavy rains were noted. Rains near the last of the month took much of the frost from the ground, and the roads have begun to dry in places. The season's progress at the close of the month was between one and two weeks behind normal conditions.

J. E. OSTRANDER, Meteorologist

E. K. DEXTER, Observer.

BULLETIN No. 304. APRIL, 1914

# Meteorological Observations
AT THE
# MASSACHUSETTS
# AGRICULTURAL EXPERIMENT
# STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.
*Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.*
*Height of Wind Instruments 72 ft.*

## MONTHLY SUMMARY.

### Pressure. In inches.

| | |
|---|---|
| Maximum reduced to freezing, | 30.12, 1st, 0 A. |
| Minimum reduced to freezing, | 29.06, 2d, 6 A. |
| Reduced† maximum reading, | 30.43, 1st, 0 A. |
| Reduced† minimum reading, | 29.37, 2d, 6 A. |
| Mean semi-daily reduced, | 30.031 |
| Monthly range, | 1.06 |

### *Air Temperature. In Degrees Fahr.

| | |
|---|---|
| Highest, | 83.5, 19th, 2:30 P. |
| Lowest, | 22.0, 4th, 6 A. |
| Mean hourly, | 42.1 |
| Mean of means of max. and min., | 42.6 |
| Mean sensible (wet bulb), | 38.1 |
| Monthly range, | 61.5 |
| Highest mean daily, | 63.2, 19th |
| Lowest mean daily, | 31.9, 4th |
| Mean maximum, | 52.5 |
| Mean minimum, | 32.8 |
| Mean daily range, | 19.7 |
| Greatest daily range, | 41.0, 18th |
| Least daily range, | 3.0, 16th |

### Humidity.

| | |
|---|---|
| Mean dew point, | 33.3 |
| Mean force of vapor, | .269 |
| Mean relative humidity, | 75.5 |

### Precipitation. In inches.

| | |
|---|---|
| Total precipitation, | 6.59 |
| Number of days on which .01 inch or more rain fell | 16 |
| Total snow in inches | 5.25 |

*Temperature in ground shelter.
†Reduced to freezing and sea-level.

### Wind.

| | |
|---|---|
| Total movement, | 6194m. |
| Greatest daily movement, | 401m., 11th |
| Least daily movement, | 58m., 8th |
| Mean daily movement, | 207 m |
| Mean hourly velocity, | 8.6 m |

Maximum pressure per square foot, 26.5 lbs.= 73m. per hour, 12th, 6P., W.

Maximum velocity for 5 minutes, 45m. per hour, 12th, 5P., W.

Prevailing Direction, Northwest.

### Summary.

| | |
|---|---|
| North | 13 per cent. |
| North Northeast | 13 " " |
| Northwest | 13 " " |
| South | 10 " " |
| West Southwest | 10 " " |
| North Northwest | 10 " " |
| Other directions | 31 " " |

### Weather.

| | |
|---|---|
| Mean cloudiness observed, | 56 per cent. |
| Total cloudiness recorded by the Sun Thermometer, | 208 hrs.=52 per cent. |
| Number of clear days, | 12 |
| Number of fair days, | 5 |
| Number of cloudy days, | 13 |

### Bright Sunshine.

Number of hours recorded, . . 194 hrs=48%.

**Rain,** 1st, 2d, 3d, 5th, 7th, 8th, 9th, 11th, 12th, 15th, 16th, 19th, 20th, 22d, 25th, 26th, 27th, 28th, 29th, 30th.

**Hail,** 15th, 16th.

**Snow,** 3d, 5th, 7th, 15th, 16th.

**Frosts after the 15th**—18th, 24th.

**Gales,** 35 or more miles per hour: 51m, 11th, S.; 73m, 12th, W.; 35m, 13th, N.W.; 35m, 15th, E.N.E.; 36m, 17th, N.; 38m, 19th, S.S.W.; 39m, 20th, N.; 39m, 21st, N.N.W.; 43m, 22d, W.N.W.; 36m, 23d, N.N.W.; 36m, 30th, N.N.E.

# DAILY SUMMARY.

| Day. | Barometer Reduced to Sea Level. | | | Temperature. Ground Shelter. | | | | | | | No. Hours of Bright Sunshine. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Maximun. | Minimum. | Mean. Semi-daily. | Maximum | Time. | Minimum. | Time. | Mean of Max. and Min. | Mean Hourly Draper. | Mean Sensible Wet Bulb. | |
| 1 | 30.43 | 29.50 | 30.057 | 47.5 | 11 A | 25.5 | 6 A | 36.5 | 37.2 | 34.3 | 4.3 |
| 2 | 29.74 | 29.37 | 29.563 | 45.0 | 8:30 A | 33.5 | 12 P | 39.3 | 39.0 | 37.3 | 4.8 |
| 3 | 30.11 | 29.72 | 29.893 | 40.0 | 4 P | 26.5 | 12 P | 33.3 | 33.4 | 29.3 | 10.3 |
| 4 | 30.20 | 30.11 | 30.178 | 41.5 | 5 P | 22.0 | 6 A | 31.7 | 31.9 | 29.7 | 11.2 |
| 5 | 30.19 | 30.07 | 30.135 | 43.0 | 5:30 P | 30.0 | 12 P | 36.5 | 34.7 | 31.3 | 3.3 |
| 6 | 30.23 | 30.06 | 30.180 | 46.5 | 3 P | 24.0 | 6 A | 35.3 | 35.1 | 30.3 | 9.7 |
| 7 | 30.15 | 30.01 | 30.073 | 36.0 | 0 A | 32.0 | 7:30 A | 34.0 | 34.1 | 32.7 | 0.0 |
| 8 | 30.01 | 29.58 | 29.715 | 56.0 | 9 P | 33.0 | 3 A | 44.5 | 39.6 | 44.3 | 0.0 |
| 9 | 29.94 | 29.63 | 29.817 | 45.0 | 0 A | 29.0 | 12 P | 37.0 | 36.7 | 32.0 | 8.1 |
| 10 | 30.15 | 29.94 | 30.075 | 49.5 | 4 P | 28.5 | 5 A | 39.0 | 37.9 | 33.3 | 11.8 |
| 11 | 30.15 | 29.88 | 30.022 | 53.0 | 1:30 P | 31.5 | 4 A | 42.3 | 41.0 | 38.7 | 10.6 |
| 12 | 30.04 | 29.65 | 29.939 | 59.5 | 12:30 P | 31.0 | 12 P | 45.3 | 42.7 | 35.3 | 10.9 |
| 13 | 30.31 | 30.04 | 30.273 | 43.5 | 5 P | 25.0 | 6 A | 34.3 | 33.0 | 27.7 | 12.3 |
| 14 | 30.33 | 30.11 | 30.247 | 60.5 | 2:30 P | 23.0 | 6 A | 41.7 | 40.9 | 33.5 | 11.2 |
| 15 | 30.23 | 29.94 | 30.151 | 48.0 | 2P | 32.5 | 4:30 A | 40.3 | 39.0 | 34.3 | 7.1 |
| 16 | 29.94 | 29.68 | 29.723 | 35.0 | 3:30 A | 32.0 | 12 P | 33.5 | 33.7 | 32.0 | 0.0 |
| 17 | 30.13 | 29.74 | 29.952 | 60.0 | 3:30 P | 26.5 | 4:30 A | 42.7 | 44.6 | 39.2 | 11.3 |
| 18 | 30.19 | 29.98 | 30.111 | 71.5 | 4 P | 30.5 | 5:30 A | 51.0 | 52.1 | 44.7 | 11.5 |
| 19 | 29.98 | 29.65 | 29.802 | 83.5 | 2:30 P | 48.0 | 5:30 A | 65.7 | 63.2 | 54.3 | 7.3 |
| 20 | 29.74 | 29.55 | 29.641 | 60.0 | 11 A | 46.0 | 12 P | 53.0 | 55.0 | 51.5 | 0.5 |
| 21 | 30.13 | 29.65 | 30.006 | 50.5 | 4:30 P | 37.5 | 11:30 P | 44.0 | 43.9 | 40.5 | 11.1 |
| 22 | 30.13 | 29.85 | 30.031 | 65.0 | 3:30 P | 38.5 | 0 A | 51.7 | 49.6 | 43.3 | 8.0 |
| 23 | 30.35 | 30.13 | 30.307 | 52.5 | 5 P | 32.5 | 12 P | 42.5 | 42.3 | 35.0 | 12.3 |
| 24 | 30.36 | 30.20 | 30.307 | 61.5 | 5 P | 29.0 | 2 A | 45.3 | 46.4 | 40.0 | 12.2 |
| 25 | 30.39 | 30.28 | 30.373 | 55.0 | 2:30 P | 39.5 | 6 A | 47.3 | 45.0 | 37.7 | 1.1 |
| 26 | 30.31 | 29.95 | 30.069 | 42.0 | 6 P | 34.5 | 1:30 A | 38.3 | 38.4 | 38.5 | 0.0 |
| 27 | 30.20 | 29.94 | 30.094 | 53.0 | 4 P | 40.0 | 2 A | 46.5 | 46.9 | 45.7 | 0.0 |
| 28 | 30.21 | 30.02 | 30.135 | 62.0 | 1:30 P | 46.5 | 4 A | 54.3 | 54.3 | 52.3 | 0.0 |
| 29 | 30.04 | 29.95 | 30.013 | 55.0 | 0 A | 40.0 | 12 P | 47.5 | 48.5 | 46.7 | 0.0 |
| 30 | 30.09 | 29.99 | 30.053 | 52.5 | 5 P | 36.0 | 12 P | 44.3 | 42.6 | 38.7 | 3.1 |

# DAILY SUMMARY.

| Day. | Humidity. | | | Wind. | | | | | Precipitation. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Mean Dew Point. | Mean Force vapor. | Mean Relative Humidity. | Prevailing Direction. | Total Movement in Miles. | Maximum Pressure Per Square Ft | Miles per Hour. | Time. | Beginning. | Ending. | Total in Inches. | |
| | | | | | | | | | | | Rain.** | Snow. |
| 1 | 31.0 | .211 | 83.0 | W. | 77 | 0.5 | 10 | 12 M | 1 P | 12 P | .54 | |
| 2 | 27.5 | .249 | 69.5 | N.W. | 183 | 2.0 | 20 | 4 P | 0 A | 12 P | .22 | |
| 3 | 23.5 | .181 | 69.0 | N.N.W. | 202 | 3.0 | 24 | 9 P | 0 A | 5 A | .03 | ¼ |
| 4 | 27.5 | .186 | 78.5 | W.N.W. | 156 | 1.5 | 17 | 2 P | | | | |
| 5 | 22.5 | .195 | 67.5 | W. | 215 | 2.5 | 22 | 2 P | 9 A | | T | T |
| 6 | 23.0 | .203 | 63.5 | W.N.W. | 95 | 0.5 | 10 | 2 A | | | | |
| 7 | 31.0 | .190 | 95.0 | N.W. | 77 | 0.0 | — | — | 1 A | 12 P | .83 | 1¾ |
| 8 | 43.0 | .313 | 96.0 | N. | 58 | 5.5 | 33 | 11 P | 0 A | 12 P | .99 | |
| 9 | 26.5 | .203 | 72 0 | N.N.W. | 320 | 3.0 | 24 | 8 P | 0 A | 4 A | .25 | |
| 10 | 27.0 | .219 | 67.0 | N.W. | 241 | 2.5 | 22 | 12 M | | | | |
| 11 | 34.5 | .264 | 76.5 | S. | 401 | 13.0 | 51 | 1 P | 10 P | 12 P | .01 | |
| 12 | 27.0 | .249 | 59.0 | W.S.W. | 344 | 26.5 | 73 | 6 P | 0 A | 5 P | .02 | |
| 13 | 20.0 | .177 | 62.5 | N.W. | 280 | 6.0 | 35 | 1 P | | | | |
| 14 | 25.5 | .237 | 61.0 | S. | 163 | 5.0 | 32 | 6 P | | | | |
| 15 | 27.5 | .332 | 69.0 | E.N.E. | 242 | 6.0 | 35 | 6 P | 5 P | 12 P | .28 | ¼ |
| 16 | 29.5 | .188 | 90.0 | N.N.E. | 244 | 3.5 | 26 | 10 A | 0 A | 10 P | .99 | 3 |
| 17 | 34.0 | .291 | 69.0 | N. | 151 | 6.5 | 36 | 4 P | | | | |
| 18 | 40.0 | .367 | 69.0 | S.W. | 124 | 3.0 | 24 | 8 P | | | | |
| 19 | 50.0 | .502 | 75.0 | S. | 266 | 7.0 | 38 | 5 P | 7 A | | T | |
| 20 | 50.0 | .403 | 91.0 | S.S.W. | 197 | 7.5 | 39 | 10 P | 2 A | 11 P | .96 | |
| 21 | 39.0 | .265 | 88.0 | N.N.W. | 286 | 7.5 | 39 | 12 M | | | | |
| 22 | 39.5 | .319 | 77.5 | W.S.W. | 252 | 9.0 | 43 | 6 P | 3 A | | T | |
| 23 | 25.0 | .255 | 53.0 | N. | 349 | 6.5 | 36 | 1 A | | | | |
| 24 | 29.5 | .327 | 50.5 | N. | 182 | 5.0 | 32 | 1 P | | | | |
| 25 | 31.0 | .269 | 66.0 | S.E. | 180 | 4.0 | 28 | 12 M | 8 P | 12 P | .28 | |
| 26 | 37.5 | .239 | 93.5 | N.N.E. | 143 | 2.5 | 22 | 9 P | 0 A | 12 P | .79 | |
| 27 | 44.5 | .321 | 91.0 | N.N.E. | 294 | 4.5 | 30 | 12 M | 0 A | 12 P | .15 | |
| 28 | 50.5 | .413 | 92.0 | W.SW. | 159 | 3.0 | 24 | 6 P | 0 A | 12 P | T | |
| 29 | 45.5 | .343 | 91.5 | E. | 131 | 1.5 | 17 | 11 A | 0 A | 12 P | .07 | |
| 30 | 35.0 | .265 | 79.5 | N.N.E. | 182 | 6.5 | 36 | 6 P | 0 A | 1 P | .18 | |

**Rain or melted snow at base of tower. *Included in following day.

## REMARKS

During the month the season made less than normal progress, and at the close of the month vegetation had hardly more than made a start. The first half the month was especially cold and but a single day during that time showed a mean temperature higher than the average for the month. The last week of the month was also colder than usual, with rain nearly every day of that time. The mean temperature placed the month with the unusually cold Aprils of the last quarter of a century.

The precipitation was more than twice the normal amount and was well distributed throughout the month. The snowfall nearly equalled that of the preceding month.

The following were the more important characteristics of the records of the several weather elements: The mean barometer was higher than the normal and the range slightly less than usual. The maximum and minimum pressures were but 30 hours apart. The total wind movement was unusually large and numerous gales were recorded. On twelve days the average daily velocity exceeded ten miles per hour.

The mean temperature was more than four degrees below the normal and the range was exceptionally large. The minimum temperature for the month was very nearly equal to the April average for that feature.

The mean dew point was considerably lower than the normal, owing to the low temperatnre of the month. The mean relative humidity was very high, due to the large number of rainy days.

The total precipitation, as previously noted, was exceptionally large, in fact, it was higher than any previous April record since this station was established.

The amount of cloudiness was much more than normal, owing to the large amount of rainy weather.

J. E. OSTRANDER, Meteorologist.

E. K. DEXTER, Observer.

**BULLETIN No. 305. MAY, 1914**

# Meteorological Observations
AT THE
# MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.
*Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.*
*Height of Wind Instruments 72 ft.*

## MONTHLY SUMMARY.

### **Pressure.** In inches.

| | |
|---|---|
| Maximum reduced to freezing, | 30 20, 18th, 9 A. |
| Minimum reduced to freezing, | 29.19, 6th, 4 A. |
| Reduced† maximum reading, | 30.50, 18th, 9 A. |
| Reduced† minimum reading, | 29.49, 6th, 4 A. |
| Mean semi-daily reduced, | 30.043 |
| Monthly range, | 1.01 |

### ***Air Temperature.** In Degrees Fahr.

| | |
|---|---|
| Highest, | 91.0, 27th, 2 P. |
| Lowest, | 27.0, 2d, 5 A. |
| Mean hourly, | 59.0 |
| Mean of means of max. and min., | 58.9 |
| Mean sensible (wet bulb), | 57.5 |
| Monthly range, | 64.0 |
| Highest mean daily, | 75.9, 27th |
| Lowest mean daily, | 40.3, 13th |
| Mean maximum, | 72.3 |
| Mean minimum, | 45.5 |
| Mean daily range, | 26.7 |
| Greatest daily range, | 39.0, 3d, 18th |
| Least daily range, | 6.0, 13th |

### **Humidity.**

| | |
|---|---|
| Mean dew point, | 49.3 |
| Mean force of vapor, | .522 |
| Mean relative humidity, | 74.5 |

### **Precipitation.** In inches.

| | |
|---|---|
| Total precipitation, | 3.56 |
| Number of days on which .01 inch or more rainfell | 11 |

### **Wind.**

| | |
|---|---|
| Total movement, | 4491m. |
| Greatest daily movement, | 364m., 6th |
| Least daily movement, | 42m., 18th |
| Mean daily movement, | 145 m |
| Mean hourly velocity, | 6.0 m |

Maximum pressure per square foot, 19.0 lbs.= 62m. per hour, 27th, 5P., W.

Maximum velocity for 5 minutes, 30m. per hour, 27th, 5P., W.

Prevailing Direction, West Northwest.

### Summary.

| | |
|---|---|
| North Northwest | 26 per cent. |
| Northeast | 13 " " |
| West | 13 " " |
| West Northwest | 10 " " |
| Northwest | 10 " " |
| Other directions | 28 " " |

### **Weather.**

| | |
|---|---|
| Mean cloudiness observed, | 42 per cent. |
| Total cloudiness recorded by the Sun Thermometer, | 129 hrs.=28 per cent. |
| Number of clear days, | 15 |
| Number of fair days, | 12 |
| Number of cloudy days, | 4 |

### **Bright Sunshine.**

Number of hours recorded, . . 324 hrs=72%.

**Rain,** 4th, 5th, 6th, 8th, 9th, 11th, 12th, 13th, 14th, 17th, 25th, 26th, 27th, 30th.

**Frosts,** 1st, 2d, 16th.

**Thunder and Lightning,** 4th, 9th, 12th, 26th, 27th.

**Gales,** 35 or more miles per hour: 37m, 1st, N.W.; 40m, 2d, N.N.W.; 40m, 6th, N.N.W.: 54m, 23d, N.W.; 38m, 25th, S.S.W.; 62m, 27th, W.

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*Temperature in ground shelter.

† Reduced to freezing and sea-level.

# DAILY SUMMARY.

| Day. | Barometer Reduced to Sea Level. | | | Temperature. Ground Shelter. | | | | | | | No. Hours of Bright Sunshine. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Maximun. | Minimum. | Mean. Semi-daily. | Maximum | Time. | Minimum. | Time. | Mean of Max. and Min. | Mean Hourly Draper. | Mean Sensible Wet Bulb. | |
| 1 | 30.10 | 29.85 | 29.967 | 54.5 | 3 P | 32.0 | 2:30 A | 43.3 | 42.4 | 37.3 | 12.7 |
| 2 | 29.98 | 29.79 | 29.891 | 65.0 | 3:30 P | 27.0 | 5 A | 46.0 | 48.5 | 43.5 | 12.3 |
| 3 | 30.09 | 29.98 | 30.061 | 74.5 | 4 P | 35.5 | 5:30 A | 55.0 | 56.2 | 50.5 | 12.0 |
| 4 | 30.07 | 29.85 | 29.988 | 69.5 | 11:30 A | 42.5 | 5:30 A | 56.0 | 56.6 | 49.3 | 7.9 |
| 5 | 29.89 | 29.52 | 29.655 | 55.0 | 2 P | 48.5 | 12 P | 51.7 | 51.4 | 49.7 | 0.0 |
| 6 | 29.78 | 29.49 | 29.641 | 69.5 | 3:30 P | 48.5 | 0 A | 59.0 | 57.7 | 53.3 | 10.7 |
| 7 | 29.88 | 29.78 | 29.847 | 74.0 | 5 P | 38.5 | 5 A | 56.3 | 56.8 | 51.5 | 10.5 |
| 8 | 29.89 | 29.73 | 29.816 | 66.5 | 12:30 P | 47.5 | 5:30 A | 57.0 | 56.5 | 51.0 | 4.4 |
| 9 | 29.77 | 29.59 | 29.708 | 74.5 | 4 P | 50.5 | 5 A | 62.5 | 60.8 | 55.3 | 11.4 |
| 10 | 29.89 | 29.75 | 29.819 | 74.5 | 2:30 P | 44.0 | 5:30 A | 59.3 | 61.6 | 56.5 | 11.2 |
| 11 | 30.04 | 29.89 | 29.981 | 72.5 | 4 P | 50.5 | 5 A | 61.5 | 62.7 | 59.0 | 10.7 |
| 12 | 30.20 | 30.03 | 30.121 | 57.0 | 0 A | 39.0 | 12 P | 48.0 | 45.6 | 41.3 | 0.0 |
| 13 | 30.20 | 30.10 | 30.160 | 43.5 | 5 P | 37.5 | 6 A | 40.5 | 40.3 | 39.0 | 0.0 |
| 14 | 30.13 | 30.00 | 30.077 | 66.0 | 5 P | 40.5 | 3 A | 53.3 | 51.3 | 46.5 | 10.5 |
| 15 | 30.19 | 30.06 | 30.125 | 64.5 | 3:30 P | 40.5 | 4:30 A | 52.5 | 53.2 | 47.7 | 13.2 |
| 16 | 30.25 | 30.13 | 30.199 | 69.0 | 5 P | 35.0 | 5 A | 52.0 | 54.1 | 48.7 | 13.5 |
| 17 | 30.40 | 30.25 | 30.350 | 72.5 | 4:30 P | 40.0 | 5:30 A | 56.3 | 56.5 | 46.5 | 11.4 |
| 18 | 30.50 | 30.40 | 30.455 | 78.5 | 3:30 P | 39.5 | 4:30 A | 59.0 | 60.5 | 52.5 | 13.1 |
| 19 | 30.49 | 30.34 | 30.419 | 82.0 | 3:30 P | 46.5 | 6 A | 64.3 | 65.4 | 54.7 | 13.0 |
| 20 | 30.36 | 30.20 | 30.279 | 84.0 | 5 P | 47.5 | 5:30 A | 65.7 | 66.9 | 59.0 | 12.9 |
| 21 | 30.20 | 30.03 | 30.103 | 76.0 | 1 P | 52.0 | 5:30 A | 64.0 | 63.0 | 56.0 | 11.1 |
| 22 | 30.03 | 29.70 | 29.839 | 82.5 | 4 P | 48.5 | 5:30 A | 65.5 | 64.5 | 60.0 | 12.1 |
| 23 | 30.00 | 29.69 | 29.822 | 68.5 | 10 A | 49.0 | 12 P | 58.7 | 60.0 | 57.5 | 12.0 |
| 24 | 30.32 | 30.00 | 30.229 | 73.0 | 1:30 P | 44.0 | 3:30 A | 58.5 | 60.0 | 55.5 | 13.0 |
| 25 | 30.34 | 30.15 | 30.261 | 75.0 | 12 M | 53.5 | 0 A | 64.3 | 64.6 | 62.7 | 6.8 |
| 26 | 30.15 | 29.93 | 30.043 | 90.0 | 3 P | 63.5 | 4 A | 76.7 | 73.7 | 67.0 | 10.0 |
| 27 | 30.04 | 29.93 | 29.973 | 91.0 | 2 P | 65.5 | 11:30 P | 78.3 | 75.9 | 70.3 | 11.6 |
| 28 | 30.29 | 29.91 | 30.081 | 85.0 | 4 P | 61.0 | 12 P | 73.0 | 73.1 | 63.7 | 14.2 |
| 29 | 30.43 | 30.28 | 30.377 | 75.0 | 4:30 P | 49.0 | 12 P | 62.0 | 61.7 | 54.0 | 14.2 |
| 30 | 30.32 | 29.94 | 30.066 | 77.5 | 5 P | 45.0 | 3 A | 61.3 | 61.5 | 58.0 | 13.2 |
| 31 | 30.06 | 29.88 | 29.967 | 80.0 | 4 P | 50.0 | 5 A | 65.0 | 67.0 | 58.5 | 14.0 |

# DAILY SUMMARY.

| Day. | Humidity. | | | Wind. | | | | | Precipitation. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Total in Inches. | |
| | Mean Dew Point. | Mean Force vapor. | Mean Relative Humidity. | Prevailing Direction. | Total Movement in Miles. | Maximum Pressure Per Square Ft | Miles per Hour. | Time. | Beginning. | Ending. | Rain.** | Snow. |
| 1 | 29.0 | .266 | 63.0 | N.N.W. | 269 | 7.0 | 37 | 10 A | | | | |
| 2 | 36.0 | .367 | 60.5 | N.N.W. | 219 | 8.0 | 40 | 10 A | | | | |
| 3 | 45 0 | .455 | 65.5 | N.W. | 91 | 1.5 | 17 | 2 P | | | | |
| 4 | 45.5 | .410 | 75.5 | S. | 142 | 5.5 | 33 | 2 P | 6 P | 12 P | .33 | |
| 5 | 48.5 | .371 | 93.5 | E.N.E. | 114 | 1.5 | 17 | 12 P | 0 A | 12 P | 1.01 | |
| 6 | 49.5 | .478 | 75.0 | N.N.W. | 364 | 8.0 | 40 | 2 P | 0 A | 4 A | .05 | |
| 7 | 48.0 | .460 | 74.5 | W. | 57 | 0.5 | 10 | 3 P | | | | |
| 8 | 48.0 | .422 | 80.0 | N.E. | 108 | 2.5 | 22 | 9 P | 5 P | 12 P | .04 | |
| 9 | 53.0 | .495 | 82.0 | W.N.W. | 116 | 2.0 | 20 | 3 P | 6 P | 10 P | .17 | |
| 10 | 52.0 | .559 | 70.0 | N.N.W. | 154 | 4.5 | 30 | 6 P | | | | |
| 11 | 55.5 | .605 | 72.0 | W.N.W. | 171 | 3 0 | 24 | 11 A | 6 P | 12 P | .14 | |
| 12 | 39.0 | .280 | 86.5 | N.E. | 144 | 2.0 | 20 | 2 P | 0 A | 12 P | 1 .03 | |
| 13 | 37.0 | .249 | 90.0 | N.E. | 155 | 1.0 | 14 | 7 A | 0 A | 12 P | .65 | |
| 14 | 43.0 | .372 | 77.0 | W.S.W. | 93 | 2.0 | 20 | 1 P | 0 A | 7 A | T | |
| 15 | 40 5 | .417 | 62.5 | N.N.W. | 169 | 4.5 | 30 | 2 P | | | | |
| 16 | 42.5 | .437 | 63 5 | W.NW. | 130 | 4.0 | 28 | 3 P | | | | |
| 17 | 40.0 | .397 | 62.5 | N.N.W. | 77 | 2.5 | 22 | 7 P | 6:30 P | | T | |
| 18 | 47.0 | .500 | 66.5 | N.N.W. | 42 | 6.5 | 10 | 6 P | | | | |
| 19 | 49.5 | .565 | 64.0 | E. | 65 | 1.0 | 14 | 2 P | | | | |
| 20 | 55.5 | .615 | 72.0 | N.W. | 48 | 0.0 | — | — | | | | |
| 21 | 52.5 | .536 | 73 5 | N.E. | 66 | 0.5 | 10 | 11 P | | | | |
| 22 | 58.5 | .570 | 87.5 | S.S.E. | 64 | 1.0 | 14 | 10 P | | | | |
| 23 | 50.0 | .540 | 82.0 | N.W. | 281 | 14.5 | 54 | 2 P | | | | |
| 24 | 53 0 | .493 | 83.0 | W. | 129 | 1.0 | 14 | 4 P | | | | |
| 25 | 61.0 | .623 | 87.5 | S.S.W. | 238 | 7.0 | 38 | 4 P | 5 A | 12 P | .05 | |
| 26 | 65.5 | .749 | 85.0 | W.S.W. | 180 | 5.0 | 32 | 6 P | 0 A | 5 P | .01 | |
| 27 | 68.0 | .861 | 81.0 | W. | 134 | 19.0 | 62 | 5 P | 5 P | 6 P | .08 | |
| 28 | 58.5 | .765 | 66.0 | N.N.W. | 199 | 5.0 | 32 | 2 P | | | | |
| 29 | 49.5 | .515 | 69.0 | S. | 151 | 5.0 | 32 | 6 P | | | | |
| 30 | 55.0 | .573 | 77.5 | S.W. | 192 | 1.5 | 17 | 12 M | 8 A | 1 P | T | |
| 31 | 52 5 | .656 | 60.5 | W. | 129 | 3.0 | 24 | 2 P | | | | |

**Rain or meltedsnow at base of tower. *Included in following day.

## REMARKS

The weather during May was more nearly normal than that of the preceding month, and the seasonal progress was rapid. Most of the precipitation occurred during the first half of the month, and the last half of the month was marked by generally clear weather with a few exceptionally warm days. Normal conditions were the rule the last part of the month.

An analysis of the records of the several weather elements shows the following features: The mean barometer was considerably higher than the normal and the range large for the time of year. Several rather high barometer records were made, while the minimum was about the usual value.

The mean temperature was about two and a half degrees above the May normal, and the maximum was the highest since 1900. The minimum was three degrees lower than the normal for this feature, but occurred so early in the month that no damage was done, although traces of ice were noted in a few places. Owing to the abnormal maximum and minimum records the range was exceptionally large for the month.

The mean dew point and relative humidity were both considerably higher than the normals for these features.

The precipitation was slightly less than the usual amount, and the number of days having a measurable amount, comparatively few.

The total wind movement was slightly less than the normal, and an exceptionally large percentage of the total was from the northwest quadrant.

The amount of bright sunshine was a hundred hours more than the normal for this month.

J. E. OSTRANDER, Meteorologist.

E. K. DEXTER, Observer.

**BULLETIN No. 306. JUNE, 1914**

# Meteorological Observations
AT THE
# MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.
*Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.*
*Height of Wind Instruments 72 ft.*

## MONTHLY SUMMARY.

### Pressure. In inches.

| | |
|---|---|
| Maximum reduced to freezing, | 29 99, 9th, 8 A. |
| Minimum reduced to freezing, | 29.34, 20th, 11 P. |
| Reduced† maximum reading, | 30.29, 9th, 8 A. |
| Reduced† minimum reading, | 29.64, 20th, 11 P. |
| Mean semi-daily reduced, | 29.952 |
| Monthly range, | 0.65 |

### *Air Temperature. In Degrees Fahr.

| | |
|---|---|
| Highest, | 90.5, 24th, 3 P. |
| Lowest, | 39.0, 6th, 5-30 A. |
| Mean hourly, | 64.4 |
| Mean of means of max. and min., | 64.6 |
| Mean sensible (wet bulb), | 59 2 |
| Monthly range, | 51.5 |
| Highest mean daily, | 79.4, 26th |
| Lowest mean daily, | 56.5, 16th |
| Mean maximum, | 76.3 |
| Mean minimum, | 52.8 |
| Mean daily range, | 23·5 |
| Greatest daily range, | 40.5, 7th |
| Least daily range, | 5.5, 28th |

### Humidity.

| | |
|---|---|
| Mean dew point, | 55.7 |
| Mean force of vapor, | .609 |
| Mean relative humidity, | 76.1 |

### Precipitation. In inches.

| | |
|---|---|
| Total precipitation, | 2.32 |
| Number of days on which .01 inch or more rainfell | 8 |

### Wind.

| | |
|---|---|
| Total movement, | 4468m. |
| Greatest daily movement, | 312m., 20th |
| Least daily movement, | 47m., 29th |
| Mean daily movement, | 149 m |
| Mean hourly velocity, | 6.2 m |

Maximum pressure per square foot, 14.0 lbs.= 53m. per hour, 15th, 6 P., S.

Maximum velocity for 5 minutes, 24m. per hour, 16th, 3P., N.W.

Prevailing Direction, West.

### Summary.

| | |
|---|---|
| North Northwest | 13 per cent. |
| North Northeast | 10 " " |
| West Northwest | 17 " " |
| South | 20 " " |
| Other directions | 40 " " |

### Weather.

| | |
|---|---|
| Mean cloudiness observed, | 48 per cent. |
| Total cloudiness recorded by the Sun Thermometer, | 174 hrs.=38 per cent. |
| Number of clear days, | 12 |
| Number of fair days, | 11 |
| Number of cloudy days, | 7 |

### Bright Sunshine.

Number of hours recorded, . . 283 hrs=62%.

**Rain,** 3d, 4th, 7th, 8th, 15th, 19th, 27th, 28th, 29th, 30th.

**Thunder and Lightning,** 15th.

**Gales,** 35 or more miles per hour: 40m, 4th, S.; 39m, 5th, N.N.W.; 37m, 10th, W.N.W.; 36m, 12th, W.N.W.; 53m, 15th, S.; 47m, 16th, N.W.

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*Temperature in ground shelter.

† Reduced to freezing and sea-level.

# DAILY SUMMARY.

| Day. | Barometer Reduced to Sea Level. | | | Temperature. Ground Shelter. | | | | | | | No. Hours of Bright Sunshine. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Maximun. | Minimum. | Mean. Semi-daily. | Maximum | Time. | Minimum. | Time. | Mean of Max. and Min. | Mean Hourly Draper. | Mean Sensible Wet Bulb. | |
| 1 | 29.94 | 29.78 | 29.882 | 79.5 | 3 P | 57.0 | 12 P | 68.3 | 68.3 | 61.0 | 13.7 |
| 2 | 30.10 | 29.94 | 30.035 | 70.0 | 5:30 P | 45.5 | 5 A | 57.7 | 59.5 | 56.3 | 14.0 |
| 3 | 30.09 | 30.03 | 30.066 | 73.0 | 12 M | 47.5 | 1:30 A | 60.3 | 62.8 | 56.5 | 13.4 |
| 4 | 30.11 | 29.66 | 29.814 | 61.5 | 9 P | 54.5 | 5 A | 58.0 | 58.1 | 56.3 | 0.0 |
| 5 | 30.10 | 29.71 | 29.961 | 68.5 | 4 P | 46.0 | 12 P | 57.3 | 58.5 | 52.0 | 14.2 |
| 6 | 30.19 | 30.09 | 30.169 | 76.5 | 4:30 P | 39.0 | 5:30 A | 57.7 | 58.0 | 51.5 | 13.2 |
| 7 | 30.20 | 29.97 | 30.078 | 83.5 | 3:30 P | 43.0 | 5 A | 63.3 | 65.2 | 58.5 | 12.7 |
| 8 | 30.22 | 29.92 | 30.059 | 81.0 | 11:30 A | 58.5 | 12 P | 69.7 | 69.2 | 62.0 | 9.1 |
| 9 | 30.29 | 30.09 | 30.206 | 67.5 | 4:30 P | 54.0 | 7 A | 60.7 | 59.3 | 54.3 | 7.7 |
| 10 | 30.09 | 29.71 | 29.837 | 87.0 | 3 P | 53.5 | 4 A | 70.3 | 69.7 | 61.0 | 11.3 |
| 11 | 29.81 | 29.75 | 29.787 | 87.5 | 3:30 P | 57.5 | 5:30 A | 72.5 | 73.6 | 70.0 | 12.2 |
| 12 | 29.88 | 29.71 | 29.795 | 87.0 | 3 P | 58.0 | 4 A | 72.5 | 72.9 | 63.7 | 13.7 |
| 13 | 29.95 | 29.86 | 29.921 | 80.0 | 2:30 P | 54.5 | 5 A | 67.3 | 69.0 | 67.0 | 11.7 |
| 14 | 30.02 | 29.93 | 29.976 | 78.0 | 5 P | 53.5 | 4 A | 65.7 | 64.7 | 59.3 | 11.8 |
| 15 | 29.93 | 29.74 | 29.815 | 71.0 | 3 P | 52.5 | 5 A | 61.7 | 60.3 | 56.0 | 5.2 |
| 16 | 29.96 | 29.70 | 29.843 | 67.5 | 3:30 P | 49.0 | 12 P | 58.3 | 56.5 | 50.3 | 7.4 |
| 17 | 30.12 | 29.96 | 30.087 | 78.5 | 4 P | 45.5 | 5:30 A | 62.0 | 61.4 | 54.3 | 14.6 |
| 18 | 30.13 | 29.98 | 30.058 | 78.0 | 3 P | 47.5 | 5:30 A | 62.7 | 63.5 | 54.7 | 12.8 |
| 19 | 30.01 | 29.64 | 29.815 | 71.0 | 12:30 P | 53.0 | 5 A | 62.0 | 61.5 | 58.3 | 4.3 |
| 20 | 30.06 | 29.66 | 29.947 | 67.5 | 5:30 P | 45.5 | 5:30 A | 56.5 | 56.8 | 47.7 | 13.2 |
| 21 | 30.10 | 29.96 | 30.039 | 77.0 | 2 P | 48.5 | 2 A | 62.7 | 62.5 | 54.0 | 6.5 |
| 22 | 30.00 | 29.93 | 29.976 | 82.5 | 5:30 P | 55.5 | 4 A | 69.0 | 67.7 | 60.5 | 9.4 |
| 23 | 30.00 | 29.87 | 29.957 | 82.5 | 1 P | 53.5 | 5 A | 68.0 | 69.5 | 63.0 | 10.7 |
| 24 | 29.93 | 29.80 | 29.866 | 90.5 | 3 P | 64.5 | 5 A | 77.5 | 77.2 | 71.7 | 9.7 |
| 25 | 29.95 | 29.79 | 29.847 | 89.5 | 2 P | 67.5 | 11:30 P | 78.5 | 79.4 | 71.7 | 12.9 |
| 26 | 30.09 | 29.95 | 30.017 | 84.0 | 4:30 P | 56.5 | 5:30 A | 70.3 | 71.4 | 65.5 | 12.0 |
| 27 | 30.02 | 29.96 | 29.980 | 71.5 | 3 P | 59.0 | 5:30 A | 65.3 | 64.9 | 63.5 | 1.7 |
| 28 | 29.99 | 29.87 | 29.939 | 61.5 | 0 A | 56.0 | 12 P | 58.7 | 58.8 | 57.0 | 0.0 |
| 29 | 29.87 | 29.97 | 29.795 | 69.5 | 2:30 P | 56.0 | 0 A | 62.7 | 61.1 | 59.0 | 2.1 |
| 30 | 30.10 | 29.83 | 29.992 | 66.0 | 11 A | 53.0 | 12 P | 59.5 | 61.2 | 58.5 | 2.1 |

# DAILY SUMMARY.

| Day. | Humidity. | | | Wind. | | | | | Precipitation. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Total in Inches. | |
| | Mean Dew Point. | Mean Force vapor. | Mean Relative Humidity. | Prevailing Direction. | Total Movement in Miles. | Maximum Pressure Per Square Ft | Miles per Hour. | Time. | Beginning. | Ending. | Rain.** | Snow. |
| 1 | 57.0 | .643 | 74.0 | N.W. | 146 | 4.5 | 30 | 2 P | | | | |
| 2 | 52.5 | .527 | 77.0 | N.N.W. | 144 | 4.0 | 28 | 2 P | | | | |
| 3 | 50.0 | .608 | 59.0 | W.N.W. | 188 | 5.5 | 33 | 2 P | 10 P | 12 P | .10 | |
| 4 | 55.0 | .480 | 91.0 | S. | 212 | 8.0 | 40 | 12 M | 0 A | 11 P | .51 | |
| 5 | 46.0 | .490 | 64.0 | N.N.W. | 300 | 7.5 | 39 | 5 P | | | | |
| 6 | 44.5 | .502 | 59.0 | N.N.E. | 92 | 0.0 | — | — | | | | |
| 7 | 54.0 | .619 | 69.5 | S.W. | 101 | 1.0 | 14 | 4 P | 7 P | | T | |
| 8 | 58.5 | .670 | 75.5 | E.S.E. | 92 | 2.0 | 20 | 1 P | 7 A | 2 P | T | |
| 9 | 51.5 | .484 | 78.5 | S.E. | 102 | 2.5 | 22 | 9 P | | | | |
| 10 | 56.5 | .715 | 68.0 | W.S.W. | 253 | 7.0 | 37 | 5 P | | | | |
| 11 | 67.5 | .846 | 80.5 | N.N.W. | 134 | 3.5 | 26 | 1 P | | | | |
| 12 | 60.0 | .748 | 69.5 | W.N.W. | 157 | 6.5 | 36 | 6 P | | | | |
| 13 | 64.5 | .761 | 81.0 | N.N.W. | 169 | 3.5 | 26 | 3 P | | | | |
| 14 | 56.5 | .573 | 81.5 | N. | 84 | 0.0 | — | — | | | | |
| 15 | 55.0 | .478 | 89.5 | S. | 190 | 14.0 | 53 | 6 P | 5:30 P | 7 P | .48 | |
| 16 | 45.5 | .440 | 69.5 | N.W. | 253 | 11.0 | 47 | 3 P | | | | |
| 17 | 47.0 | .572 | 57.0 | W.N.W. | 113 | 1.0 | 14 | 11 A | | | | |
| 18 | 49.0 | .552 | 63.0 | S. | 181 | 3.0 | 24 | 2 P | | | | |
| 19 | 57.0 | .528 | 87.5 | S. | 166 | 3.0 | 24 | 2 P | 1:30 P | 12 P | .69 | |
| 20 | 41.5 | .426 | 61.5 | W.NW. | 312 | 5.0 | 32 | 12 M | | | | |
| 21 | 48.0 | .542 | 63.0 | S.W. | 121 | 1.5 | 17 | 4 P | | | | |
| 22 | 57.0 | .628 | 76.0 | W. | 67 | 0.0 | — | — | | | | |
| 23 | 63.5 | .679 | 87.5 | S. | 114 | 2.0 | 20 | 4 P | | | | |
| 24 | 70.0 | .876 | 85.0 | W.S.W. | 121 | 1.0 | 14 | 4 P | | | | |
| 25 | 68.5 | .968 | 73.0 | W.N.W. | 258 | 5.5 | 33 | 4 P | | | | |
| 26 | 62.5 | .762 | 74.5 | S.S.W. | 114 | 1.7 | 17 | 3 P | | | | |
| 27 | 62.5 | .621 | 91.0 | S. | 67 | 0.0 | — | — | 5 A | 12 P | .15 | |
| 28 | 56.0 | .487 | 93.0 | N.N.E. | 87 | 0.0 | — | — | 0 A | 12 P | .33 | |
| 29 | 58.0 | .521 | 94.5 | N.N.E. | 47 | 0.0 | — | — | 2 P | 7:30 P | .05 | |
| 30 | 57.0 | .523 | 90.5 | W. | 83 | 0.0 | — | — | 8 A | 10 A | .01 | |

**Rain or melted snow at base of tower.

*Included in following day.

## REMARKS

The weather during June was generally seasonable and free from unusual features. Comparatively clear and cool, with a rather large wind movement and considerably deficient in precipitation give a fair summary of the prevailing conditions. Traces of frost were reported, on two dates, from the low grounds in the vicinity, but the temperature did not fall low enough for the formation of frost at the station.

A comparison of the records of the various weather elements with the normals of the station shows the following features: The maximum and mean barometer records were practically normal. The minimum barometer was not as low as usual, giving a comparatively small range.

The total wind movement was about twenty percent more than the average, and more variable in direction than usual. A comparatively large number of gales were noted, nearly all during the first half the month.

The maximum and minimum temperatures were both practically normal while the mean temperature was about a degree and a half lower than the normal. The greatest daily range of temperature, on the 7th, was an unusually large amount for that feature.

The mean dew point was slightly below the normal while the relative humidity was several points higher than the average, notwithstanding the small amount of cloudy weather.

The total precipitation was about seventy percent of the normal and was fairly well distributed throughout the month. Only a single thunder storm was noted during the month.

J. E. OSTRANDER, Meteorologist.

R. E. McLAIN, Observer.

**BULLETIN No. 307.** **JULY, 1914**

# Meteorological Observations

AT THE

# MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.

*Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.*

*Height of Wind Instruments 72 ft.*

## MONTHLY SUMMARY.

### **Pressure.** In inches.

| | |
|---|---|
| Maximum reduced to freezing, | 29.92, 30th, 9 P. |
| Minimum reduced to freezing, | 29.36, 20th, 0 A. |
| Reduced† maximum reading, | 30.21, 30th, 9 P. |
| Reduced† minimum reading, | 29.66, 20th, 0 A. |
| Mean semi-daily reduced, | 29.981 |
| Monthly range, | 0.55 |

### ***Air Temperature.** In Degrees Fahr.

| | |
|---|---|
| Highest, | 89.0, 13th, 3:30 P. |
| Lowest, | 45.0, 1st, 4-30 A. |
| Mean hourly, | 67.7 |
| Mean of means of max. and min., | 68.6 |
| Mean sensible (wet bulb), | 62.6 |
| Monthly range, | 44.0 |
| Highest mean daily, | 78.0, 17th |
| Lowest mean daily, | 56.5, 3d |
| Mean maximum, | 78.5 |
| Mean minimum, | 58.6 |
| Mean daily range, | 19.9 |
| Greatest daily range, | 33.0, 21st |
| Least daily range, | 6.0, 3d |

### **Humidity.**

| | |
|---|---|
| Mean dew point, | 60.0 |
| Mean force of vapor, | .663 |
| Mean relative humidity, | 80.7 |

### **Precipitation.** In inches.

| | |
|---|---|
| Total precipitation, | 3.53 |
| Number of days on which .01 inch or more rain fell | 14 |

### **Wind.**

| | |
|---|---|
| Total movement, | 3555m. |
| Greatest daily movement, | 254m., 17th |
| Least daily movement, | 35m., 23d |
| Mean daily movement, | 115 m |
| Mean hourly velocity, | 4.8 m |

Maximum pressure per square foot, 8.0 lbs.=40m. per hour, 21st, 12 M., W.S.W.

Maximum velocity for 5 minutes, 30m. per hour, 21st, 2P., W.S.W.

Prevailing Direction, South.

### Summary.

| | |
|---|---|
| South | 19 per cent. |
| South Southwest | 13 " " |
| South Southeast | 13 " " |
| Northwest | 10 " " |
| North Northeast | 10 " " |
| Other directions | 35 " " |

### **Weather.**

| | |
|---|---|
| Mean cloudiness observed, | 69 per cent. |
| Total cloudiness recorded by the Sun Thermometer, | 221 hrs.=48 per cent. |
| Number of clear days, | 7 |
| Number of fair days, | 16 |
| Number of cloudy days, | 8 |

### **Bright Sunshine.**

Number of hours recorded, 241 hrs=52%.

**Rain,** 1st, 2d, 3d, 6th, 7th, 9th, 10th, 11th, 15th, 17th, 18th, 21st, 23d, 28th, 29th, 30th.

**Thunder and Lightning,** 9th, 11th, 12th, 17th, 18th, 21st.

**Gales,** 35 or more miles per hour: 40m, 21st, W.S.W.

---

*Temperature in ground shelter.

† Reduced to freezing and sea-level.

# DAILY SUMMARY.

| Day. | Barometer Reduced to Sea Level. | | | Temperature. Ground Shelter. | | | | | | | No. Hours of Bright Sunshine. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Maximun. | Minimum. | Mean. Semi-daily. | Maximum | Time. | Minimum. | Time. | Mean of Max. and Min. | Mean Hourly Draper. | Mean Sensible Wet Bulb | |
| 1 | 30.19 | 29.99 | 30.110 | 73.0 | 2 P | 45.0 | 4:30 A | 59.0 | 59.8 | 58.5 | 9.0 |
| 2 | 30.03 | 29.86 | 29 927 | 69.0 | 3 P | 56.0 | 12 P | 62.5 | 60.1 | 56.3 | 6.0 |
| 3 | 30.17 | 30.03 | 30.129 | 60.0 | 6 P | 54.0 | 5 A | 57.0 | 56.5 | 55.3 | 0.6 |
| 4 | 30.17 | 30.06 | 30.137 | 81.0 | 4:30 P | 52.5 | 5 A | 66.7 | 64.3 | 61.0 | 14.0 |
| 5 | 30.15 | 30.04 | 30 130 | 78.0 | 2 P | 58.0 | 4 A | 68.0 | 65.2 | 60.5 | 7.1 |
| 6 | 30.15 | 29 93 | 30.107 | 75.0 | 1 P | 56.0 | 5:30 A | 65.5 | 65.2 | 59.3 | 12.5 |
| 7 | 29.95 | 29.77 | 29 842 | 68.0 | 12 M | 57.0 | 1 A | 62.5 | 62.3 | 60.5 | 0.1 |
| 8 | 30.12 | 29.95 | 30.077 | 83.5 | 1:30 P | 62.0 | 4 A | 72.7 | 71.5 | 66.7 | 6.8 |
| 9 | 30.15 | 30.04 | 30.111 | 81.0 | 3 P | 63.0 | 12 P | 72.0 | 69.3 | 64.7 | 5.6 |
| 10 | 30.07 | 29 97 | 30.021 | 75.0 | 1:30 P | 63.0 | 4 A | 69.0 | 68.5 | 64.0 | 4.7 |
| 11 | 29.98 | 29.85 | 29.912 | 82.5 | 2:30 P | 64 0 | 11:30 P | 73.3 | 70.9 | 65 3 | 8.6 |
| 12 | 29.90 | 29.82 | 29.863 | 87.0 | 4 P | 64.0 | 4:30 A | 75.5 | 73.9 | 68.3 | 8.2 |
| 13 | 29.95 | 29.85 | 29 911 | 89.0 | 3:30 P | 64 0 | 5:30 A | 76.5 | 75.1 | 66.5 | 10.3 |
| 14 | 30.02 | 29.95 | 29.991 | 81.0 | 3:30 P | 59.0 | 5 A | 70.0 | 70.6 | 63.7 | 8.7 |
| 15 | 29.97 | 29.88 | 29 911 | 84.0 | 5 P | 64.0 | 6 A | 74.0 | 72.2 | 67.3 | 6.7 |
| 16 | 29.95 | 29.82 | 29.885 | 85.0 | 4:30 P | 70 0 | 6 A | 77.5 | 75.6 | 71.5 | 7.1 |
| 17 | 29.82 | 29.67 | 29.751 | 88.0 | 2 P | 73.0 | 5 A | 80.5 | 78.0 | 74.0 | 6.9 |
| 18 | 29.82 | 29.68 | 29.755 | 84.0 | 4 P | 67.0 | 12 P | 75.5 | 76.3 | 69.5 | 14.0 |
| 19 | 29.95 | 29.82 | 29.868 | 77.0 | 2:30 P | 55.0 | 12 P | 66 0 | 67.2 | 62.5 | 12.4 |
| 20 | 30.05 | 29.66 | 30.017 | 78.0 | 6:30 P | 47.5 | 5:30 A | 62.7 | 62.5 | 53.0 | 12.9 |
| 21 | 30.00 | 29.81 | 29.928 | 86.5 | 1 P | 53.5 | 6 A | 70.0 | 67.6 | 64.7 | 7.5 |
| 22 | 30.14 | 30 00 | 30.121 | 80.5 | 5 P | 50.5 | 6 A | 65.5 | 65 8 | 56.7 | 12.3 |
| 23 | 30.13 | 29.92 | 30.014 | 66.0 | 2 P | 54.5 | 5 A | 60.3 | 60.7 | 59.3 | 0.0 |
| 24 | 29.97 | 29.88 | 29.932 | 83.5 | 4:30 P | 58.5 | 5 A | 71.0 | 69.3 | 63.3 | 8.0 |
| 25 | 29.90 | 29.76 | 29.837 | 84.0 | 4 P | 64.5 | 6 A | 74.3 | 72.7 | 68.3 | 8.6 |
| 26 | 29.95 | 29.82 | 29.888 | 85.5 | 3:30 P | 61.5 | 5:30 A | 73.5 | 74.5 | 69.0 | 13.7 |
| 27 | 29.99 | 29.91 | 29.959 | 83 0 | 3 P | 56.0 | 5:30 A | 69.5 | 70.0 | 39.0 | 8.6 |
| 28 | 29.96 | 29 90 | 29.945 | 71.5 | 11 A | 59.0 | 7 A | 65.3 | 64 8 | 59.3 | 0.0 |
| 29 | 30.12 | 29.92 | 30.022 | 66 5 | 11 A | 56.5 | 12 P | 61.5 | 60.2 | 57.0 | 2.3 |
| 30 | 30 21 | 30.12 | 30.203 | 71.5 | 2:30 P | 55.5 | 1 A | 63.5 | 62.6 | 56.7 | 8.2 |
| 31 | 30.21 | 29 96 | 30,093 | 77.5 | 2:30 P | 53.5 | 5:30 A | 65.3 | 65.9 | 59.3 | 9.5 |

# DAILY SUMMARY.

| Day. | Humidity. | | | Wind. | | | | | Precipitation. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Total in Inches. | |
| | Mean Dew Point. | Mean Force vapor. | Mean Relative Humidity. | Prevailing Direction. | Total Movement in Miles. | Maximum Pressure Per Square Ft | Miles per Hour. | Time. | Beginning.* | Ending. | Rain.** | Snow. |
| 1 | 57.0 | .533 | 87.5 | S.E. | 74 | 1.0 | 14 | 7 P | 5 P | 12 P | .38 | |
| 2 | 54.5 | .480 | 88.5 | E.N.E. | 178 | 1.0 | 14 | 12 M | 0 A | 7 P | .42 | |
| 3 | 54.5 | .455 | 92.5 | N.N.E. | 36 | 0.0 | — | — | 7 A | 3 P | .21 | |
| 4 | 60.0 | .585 | 90.5 | N.N.E. | 50 | 0.5 | 10 | 8 P | | | | |
| 5 | 58.5 | .591 | 85.0 | S. | 149 | 4.0 | 28 | 2 P | | | | |
| 6 | 55.5 | .605 | 73.5 | S.E. | 108 | 0.5 | 10 | 10 P | 4:30 P | 12 P | .30 | |
| 7 | 59.5 | .558 | 90.5 | S.S.W. | 251 | 3.5 | 26 | 5 P | 0 A | 7 P | .30 | |
| 8 | 64.5 | .750 | 81.5 | S. | 230 | 3.0 | 24 | 2 P | | | | |
| 9 | 63.5 | .656 | 89.0 | S.E. | 90 | 0.5 | 10 | 4 P | 4 P | 5 P | .36 | |
| 10 | 62.0 | .679 | 83.0 | S. | 85 | 0.5 | 10 | 9 P | 10 P | 12 P | .01 | |
| 11 | 64.0 | .656 | 92.5 | S. | 162 | 2.0 | 20 | 6 P | 6:30 P | 8:30 P | .50 | |
| 12 | 67.0 | .765 | 87.5 | W. | 69 | 0.0 | — | — | | | | |
| 13 | 63.5 | .758 | 78.5 | W.N.W. | 61 | 0.0 | — | — | | | | |
| 14 | 61.0 | .691 | 78.5 | S.S.E. | 96 | 1.0 | 14 | 3 P | | | | |
| 15 | 65.5 | .742 | 86.5 | S. | 46 | 0.0 | — | — | 1 A | 9 P | T | |
| 16 | 70.0 | .850 | 88.0 | S.S.W. | 117 | 3.0 | 24 | 3 P | | | | |
| 17 | 73.0 | .901 | 90.0 | S.S.W. | 254 | 4.5 | 30 | 4 P | 4 P | 5 P | .21 | |
| 18 | 67.0 | .857 | 79.0 | N.W. | 67 | 2.0 | 20 | 12 M | 1 A | 2 A | .07 | |
| 19 | 58.5 | .711 | 69.0 | N.N.W. | 243 | 2.0 | 20 | 3 P | | | | |
| 20 | 45.5 | .549 | 56.5 | N.W. | 80 | 2.0 | 20 | 11 A | | | | |
| 21 | 62.0 | .705 | 80.5 | S.S.W. | 147 | 8.0 | 40 | 12 M | 2 P | 3 P | .36 | |
| 22 | 50.5 | .633 | 58.0 | N. | 142 | 3.0 | 24 | 1 P | | | | |
| 23 | 58.0 | .529 | 92.0 | W.S.W. | 35 | 0.0 | — | — | 9 A | 8 P | .25 | |
| 24 | 60.0 | .677 | 79.5 | E. | 84 | 0.0 | — | — | | | | |
| 25 | 67.0 | .765 | 87.5 | S. | 96 | 1.0 | 14 | 12 M | | | | |
| 26 | 66.5 | .927 | 70.5 | W.N.W. | 117 | 2.5 | 22 | 11 A | | | | |
| 27 | 52.0 | .710 | 55.5 | N.W. | 80 | 0.0 | — | — | | | | |
| 28 | 56.5 | .572 | 81.5 | S.E. | 70 | 0.0 | — | — | 6 P | 10 P | .01 | |
| 29 | 55.0 | .514 | 83.5 | N.N.E. | 113 | 2.5 | 22 | 2 P | 6 A | 3 P | .15 | |
| 30 | 53.0 | .538 | 76.0 | E.N.E. | 162 | 2.0 | 20 | 9 A | 7 P | 8 P | T | |
| 31 | 55.0 | .623 | 70.0 | E.S.E. | 63 | 0.0 | — | — | | | | |

**Rain or meltedsnow at base of tower. *Included in following day.

## REMARKS

The weather during July was more cloudy than usual with precipitation on about half the days. Notwithstanding the frequency of the rains the total precipitation was considerably less than the normal. The general absence of extremely warm days was also an important feature. Numerous thunder storms were also noted, several of considerable severity.

The best estimate however of the weather conditions prevailing can be obtained by a comparison of the records of the several weather elements with the corresponding normals of the station. Such comparison shows the following features of interest.

The mean barometer was slightly higher than the normal and the range was the smallest since 1899. While the minimum pressure was considerably above the normal, the maximum was correspondingly low. Owing to the small fluctuation in pressure but one gale was noted during the month.

The mean temperature was about three degrees below the normal, making it the coolest July since 1891. The maximum temperature was the lowest since 1889, excepting only 1906, when the maximum record was 88.5 degrees. The mean maximum was also an unusually low record. The minimum temperature was about the usual value and was recorded on the first day of the month.

The mean dew point was but slightly below the normal while the relative humidity was the highest since 1906.

Although there were numerous rainstorms the total precipitation was only about 80 per cent of the normal. In this connection it should be remembered that July is the month with the greatest precipitation record at this station, due to the two extremely large monthly records of 1889 and 1897, when 10.52 and 14.51 inches were respectively recorded.

The total wind movement was practically normal, but the large amount from the south was very unusual for this station.

The amount of sunshine was considerably less than the normal, the record showing the smallest amount since 1902.

J. E. OSTRANDER, Meteorologist.

R. E. McLAIN, Observer.

## BULLETIN No. 308. AUGUST, 1914

# Meteorological Observations
AT THE
# MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.
*Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.*
*Height of Wind Instruments 72 ft.*

## MONTHLY SUMMARY.

### **Pressure.** In inches.

Maximum reduced to freezing, 29.97, 26th, 8 A.
Minimum reduced to freezing, 29.42, 24th, 5 A.
Reduced† maximum reading, 30.26, 26th, 8 A.
Reduced† minimum reading, 29.71, 24th, 5 A.

| | |
|---|---|
| Mean semi-daily reduced | 30.008 |
| Monthly range | 0.55 |

### ***Air Temperature.** In Degrees Fahr.

| | |
|---|---|
| Highest | 95.0, 9th, 2:30 P. |
| Lowest | 47.5, 25th, 6 A.; 26th, 6 A. |
| Mean hourly | 68.9 |
| Mean of means of max. and min. | 69.7 |
| Mean sensible (wet bulb) | 63.5 |
| Monthly range | 47.5 |
| Highest mean daily | 79.7, 10th |
| Lowest mean daily | 60.5, 29th |
| Mean maximum | 79.9 |
| Mean minimum | 59.6 |
| Mean daily range | 20.3 |
| Greatest daily range | 32.0, 9th |
| Least daily range | 3.5, 29th |

### **Humidity.**

| | |
|---|---|
| Mean dew point | 60.8 |
| Mean force of vapor | .687 |
| Mean relative humidity | 80.3 |

### **Precipitation.** In inches.

| | |
|---|---|
| Total precipitation | 5.11 |
| Number of days on which .01 inch or more rain fell | 10 |

### **Wind.**

| | |
|---|---|
| Total movement | 3198m. |
| Greatest daily movement | 226m., 11th |
| Least daily movement | 43m., 26th |
| Mean daily movement | 103 m |
| Mean hourly velocity | 4.3 m |

Maximum pressure per square foot, 17.0 lbs.=58m. per hour, 21st, 1 P., N.N.W.
Maximum velocity for 5 minutes, 30m. per hour, 21st, 1 P., N.N.W.
Prevailing Direction, West.

### Summary.

| | |
|---|---|
| South Southwest | 32 per cent. |
| North | 10 " " |
| Northwest | 10 " " |
| North Northeast | 10 " " |
| Other directions | 38 " " |

### **Weather.**

| | |
|---|---|
| Mean cloudiness observed | 61 per cent. |
| Total cloudiness recorded by the Sun Thermometer | 220 hrs.=51 per cent. |
| Number of clear days | 2 |
| Number of fair days | 19 |
| Number of cloudy days | 10 |

### **Bright Sunshine.**

Number of hours recorded, . . 209 hrs=49%.

**Rain**, 1st, 3d, 5th, 11th, 12th, 16th, 17th, 18th, 19th, 20th, 21st, 24th, 28th, 29th.

**Thunder and Lightning**, 3d, 11th, 20th, 24th.

**Gales**, 35 or more miles per hour: 58m, 21st, N.N.W.

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*Temperature in ground shelter.
† Reduced to freezing and sea-level.

# DAILY SUMMARY.

| Day. | Barometer Reduced to Sea Level. | | | Temperature. Ground Shelter. | | | | | | | No. Hours of Bright Sunshine. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Maximun. | Minimum. | Mean. Semi-daily. | Maximum | Time. | Minimum. | Time. | Mean of Max. and Min. | Mean Hourly Draper. | Mean Sensible Wet Bulb | |
| 1 | 29.96 | 29.89 | 29.940 | 82.5 | 2:30 P | 57.0 | 6:30 A | 69.7 | 69.1 | 61.0 | 8.7 |
| 2 | 29.96 | 29.77 | 29.868 | 85.0 | 2:30 P | 56.0 | 4 A | 70.5 | 70.7 | 65.5 | 9.0 |
| 3 | 30.03 | 29.80 | 29.924 | 82.0 | 3:30 P | 63.0 | 6 A | 72.5 | 69.9 | 61.7 | 9.7 |
| 4 | 30.14 | 30.03 | 30.125 | 70.5 | 3 P | 56.5 | 5 A | 63.5 | 64.5 | 59.5 | 0.6 |
| 5 | 30.13 | 30.09 | 30.118 | 72.0 | 5 P | 59 5 | 4:30 A | 65.7 | 64.5 | 61.7 | 1.7 |
| 6 | 30.16 | 30.03 | 30.125 | 83.0 | 3:30 P | 61.0 | 4:30 A | 72.0 | 70.5 | 65.3 | 9.9 |
| 7 | 30.11 | 29 98 | 30.065 | 86.5 | 3:30 P | 63.5 | 2 A | 75.0 | 72.1 | 67.5 | 7.3 |
| 8 | 30.05 | 29.95 | 30.015 | 90.5 | 4 P | 70.0 | 6 A | 80.3 | 77.0 | 70.5 | 6.9 |
| 9 | 30.08 | 29.98 | 30.047 | 95.0 | 2:30 P | 63 0 | 5:30 A | 79.0 | 78.3 | 71.3 | 9.4 |
| 10 | 30.05 | 29.97 | 30 020 | 92.5 | 2 P | 71.0 | 5:30 A | 81.7 | 79.7 | 72.3 | 8.5 |
| 11 | 30.00 | 29.91 | 29 957 | 83 0 | 1 P | 71.0 | 12 P | 77.0 | 76.1 | 71.7 | 4.7 |
| 12 | 30.07 | 29 96 | 30.051 | 71.0 | 0 A | 62.0 | 12 P | 66 5 | 66.3 | 64.3 | 0.0 |
| 13 | 30.06 | 29.96 | 30.025 | 82.0 | 5 P | 59.0 | 12 P | 70.5 | 69.4 | 62.5 | 11.7 |
| 14 | 30.00 | 29 83 | 29 913 | 80.5 | 1 P | 52.0 | 5 A | 66.3 | 67.9 | 60.7 | 8.3 |
| 15 | 29.96 | 29.84 | 29.905 | 83 5 | 2 P | 62.5 | 7 A | 73 0 | 71.1 | 62.3 | 9.1 |
| 16 | 30.04 | 29 95 | 30.030 | 81.0 | 2:30 P | 54.0 | 5:30 A | 67.5 | 69.4 | 62.0 | 10.8 |
| 17 | 30.02 | 29.94 | 29 989 | 80 0 | 2 P | 61.0 | 12 P | 70.5 | 67 8 | 63.7 | 2.8 |
| 18 | 30.01 | 29.90 | 29.958 | 76 5 | 5 P | 57.5 | 5:30 A | 67.0 | 66.5 | 65.0 | 0.6 |
| 19 | 30.06 | 29.91 | 30.003 | 85 0 | 3 P | 67.0 | 5:30 A | 76.0 | 74.5 | 70.0 | 10.3 |
| 20 | 30.10 | 29 98 | 30.063 | 77.5 | 3 P | 64.0 | 12 P | 70.7 | 70.5 | 66.0 | 6.0 |
| 21 | 29.98 | 29.80 | 29.901 | 73.5 | 1 P | 61.0 | 5:30 A | 67.3 | 65.3 | 63.5 | 2.3 |
| 22 | 30.02 | 29.85 | 29.987 | 83.5 | 3:30 P | 59.0 | 6 A | 71.3 | 69.7 | 61.3 | 10.7 |
| 23 | 39.05 | 29 78 | 29.926 | 82.0 | 1:30 P | 54.5 | 5 A | 68.3 | 69.5 | 62 5 | 10.3 |
| 24 | 30.05 | 29.71 | 29.849 | 78.0 | 3:30 P | 56.0 | 12 P | 67.0 | 69.9 | 63.5 | 2.0 |
| 25 | 30.20 | 30 05 | 30.153 | 75.0 | 3 P | 47.5 | 6 A | 61.3 | 60.7 | 53.5 | 10.3 |
| 26 | 30.26 | 30.15 | 30 213 | 77.0 | 4 P | 47.5 | 6 A | 62.3 | 61 2 | 55.3 | 11.4 |
| 27 | 30.21 | 30 09 | 30.157 | 77.0 | 3:30 P | 55.0 | 6 A | 66.0 | 64.1 | 59.3 | 5.5 |
| 28 | 30.12 | 30.05 | 30.099 | 71.5 | 1:30 P | 61.0 | 3 A | 66.3 | 64.5 | 60.3 | 0.0 |
| 29 | 30.09 | 29.84 | 29.948 | 62.5 | 0 A | 59.0 | 12 P | 60.7 | 60 5 | 60.0 | 0.0 |
| 30 | 29.93 | 29.80 | 29.885 | 77.0 | 4:30 P | 58.0 | 5 A | 67.5 | 65.5 | 60.3 | 9.5 |
| 31 | 30.03 | 29.91 | 29.974 | 80.5 | 6 P | 58.0 | 3 A | 69.3 | 68.6 | 63.0 | 10.5 |

# DAILY SUMMARY.

| Day. | Humidity. | | | Wind. | | | | | Precipitation. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Total in Inches. | |
| | Mean Dew Point. | Mean Force vapor. | Mean Relative Humidity. | Prevailing Direction. | Total Movement in Miles. | Maximum Pressure Per Square Ft | Miles per Hour. | Time. | Beginning. | Ending. | Rain.** | Snow. |
| 1 | 56.0 | .718 | 64.5 | N.W. | 78 | 3.5 | 26 | 2 P | 7 P | | T | |
| 2 | 63.5 | .716 | 88.5 | S.S.W. | 147 | 4.0 | 28 | 3 P | | | | |
| 3 | 57.0 | .777 | 66.5 | N.N.E. | 70 | 0.0 | — | — | 4 A | 5:30 P | .06 | |
| 4 | 57.0 | .593 | 77.0 | N.E. | 125 | 0.0 | — | — | | | | |
| 5 | 60.5 | .595 | 89.5 | N.N.E. | 109 | 0.0 | — | — | 2:30 A | 5 A | .20 | |
| 6 | 63.0 | .718 | 80.0 | S. | 116 | 0.0 | — | — | | | | |
| 7 | 66.0 | .741 | 86.5 | S.S.W. | 142 | 1.5 | 17 | 7 P | | | | |
| 8 | 68.0 | .891 | 78.0 | S.S.W. | 103 | 0.0 | — | — | | | | |
| 9 | 70.0 | .895 | 84.5 | S.S.W. | 56 | 0.0 | — | — | | | | |
| 10 | 69.5 | .941 | 77.0 | S. | 185 | 5.5 | 33 | 2 P | | | | |
| 11 | 70.0 | .861 | 85.5 | S.S.W. | 226 | 3.0 | 24 | 11 A | 3 P | 9 P | .38 | |
| 12 | 63.0 | .648 | 88.5 | N. | 108 | 1.5 | 17 | 8 A | 1 P | 2 P | .01 | |
| 13 | 59.0 | .668 | 76.0 | N.N.W. | 53 | 0.0 | — | — | | | | |
| 14 | 57.5 | .637 | 75.5 | S.E. | 126 | 2.0 | 20 | 12 M | | | | |
| 15 | 59.0 | .673 | 77.0 | N.W. | 83 | 1.0 | 14 | 1 P | | | | |
| 16 | 57.5 | .755 | 62.5 | W.N.W. | 94 | 0.5 | 10 | 1 P | 11 P | | T | |
| 17 | 62.0 | .640 | 87.5 | S.S.W. | 65 | 4.5 | 30 | 3 P | 3 P | 6 P | .19 | |
| 18 | 64.5 | .648 | 95.0 | S.S.W. | 65 | 2.0 | 20 | 3 P | 10 A | 10 P | .29 | |
| 19 | 68.5 | .806 | 86.5 | W. | 66 | 0.0 | — | — | 7 P | | T | |
| 20 | 63.5 | .722 | 83.0 | N.E. | 72 | 0.0 | — | — | 0 A | 12 P | 1.85 | |
| 21 | 62.5 | .605 | 94.5 | E. | 70 | 17.0 | 58 | 1 P | 0 A | 7 P | .87 | |
| 22 | 57.0 | .661 | 72.0 | N. | 104 | 3.0 | 24 | 10 A | | | | |
| 23 | 59.0 | .687 | 75.5 | S.S.W. | 127 | 3.5 | 26 | 2 P | | | | |
| 24 | 60.5 | .695 | 76.0 | W.N.W. | 190 | 1.0 | 14 | 5 P | 10:30A | 11 A | T | |
| 25 | 48.5 | .499 | 70.0 | N. | 77 | 0.5 | 10 | 2 P | | | | |
| 26 | 51.0 | .521 | 73.0 | N.N.E. | 43 | 0.0 | — | — | | | | |
| 27 | 57.0 | .573 | 82.0 | S.S.W. | 99 | 1.5 | 17 | 5 P | | | | |
| 28 | 57.5 | .586 | 83.0 | S.S.W. | 137 | 0.5 | 10 | 1 A | 3 P | 12 P | .11 | |
| 29 | 59.5 | .538 | 94.5 | E.N.E. | 66 | 0.0 | — | — | 0 A | 9 P | 1.15 | |
| 30 | 58.5 | .583 | 85.0 | N.W. | 101 | 2.0 | 20 | 12 M | | | | |
| 31 | 59.5 | .691 | 75.0 | W. | 95 | 0.5 | 10 | 10 A | | | | |

**Rain or melted snow at base of tower.

*Included in following day.

# REMARKS

The weather during the month was more than usually cloudy with a comparatively high relative humidity and large precipitation. From the 6th to the 12th there was a period of both high temperature and high humidity combined making it the most unpleasant part of the month. Nearly all the precipitation occurred during the last half the month, the storm of the 20th-21st was exceptionally severe. More than one-half the total precipitation occurred during that period; as well as the high gale and heavy thunderstorm of the month. The last half the month was generally cooler than the mean for the month.

Comparing the records of the several weather elements for the month with the corresponding normals the following features are noted: The mean barometer was practically normal and the range of pressure unusually small, even for August—the month of least range. The interval between the minimum and maximum pressures was only 51 hours.

The total wind movement was practically normal, but the number of days with a prevailing direction of South Southwest was exceptionally large.

The maximum and minimum temperatures were considerably above the usual values for these records, and the mean hourly temperature was a degree above the normal. The monthly range was slightly smaller than usual.

The mean dew point was nearly normal and the mean relative humidity the highest since 1906.

The total precipitation was nearly an inch more than usual and more than three-fourths occurred during two storms. Norwithstanding the large amount of rain less than one-third the days of the month showed a measurable amount.

The amount of sunshine was considerably less than the normal; only two days being recorded as clear.

J. E. OSTRANDER, Meteorologist.

R. E. McLAIN, Observer.

## BULLETIN No. 309. SEPTEMBER, 1914

# Meteorological Observations

AT THE

# MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.
*Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.*
*Height of Wind Instruments 72 ft.*

## MONTHLY SUMMARY.

### Pressure. In inches.

| | |
|---|---|
| Maximum reduced to freezing, | 30.23, 14th, 9 A. |
| Minimum reduced to freezing, | 29.41, 24th, 3 P. |
| Reduced† maximum reading, | 30.53, 14th, 9 A. |
| Reduced† minimum reading, | 29.69, 24th, 3 P. |
| Mean semi-daily reduced, | 30.131 |
| Monthly range, | 0.84 |

### *Air Temperature. In Degrees Fahr.

| | |
|---|---|
| Highest, | 96.5, 22d, 3:30 P. |
| Lowest, | 24.5, 29th, 6 A. |
| Mean hourly, | 60.2 |
| Mean of means of max. and min., | 61.0 |
| Mean sensible (wet bulb), | 53.1 |
| Monthly range, | 72.0 |
| Highest mean daily, | 78.7, 2d |
| Lowest mean daily, | 42.0, 28th |
| Mean maximum, | 75.6 |
| Mean minimum, | 46.3 |
| Mean daily range, | 29.3 |
| Greatest daily range, | 44.5, 22d |
| Least daily range, | 13.0, 25th |

### Humidity.

| | |
|---|---|
| Mean dew point, | 48.9 |
| Mean force of vapor, | .503 |
| Mean relative humidity, | 74.3 |

### Precipitation. In inches.

| | |
|---|---|
| Total precipitation, | .52 |
| Number of days on which .01 inch or more rain fell | 6 |

### Wind.

| | |
|---|---|
| Total movement, | 2992m. |
| Greatest daily movement, | 266m., 26th |
| Least daily movement, | 22m., 22d |
| Mean daily movement, | 100 m |
| Mean hourly velocity, | 4.2 m |

Maximum pressure per square foot, 11.0 lbs.= 47m. per hour, 28th, 10 A., N.N.E.
Maximum velocity for 5 minutes, 30m. per hour, 28th, 10 A., N.N.E.
Prevailing Direction, North.

### Summary.

| | |
|---|---|
| North Northeast | 20 per cent. |
| North | 13 " " |
| Southwest | 13 " " |
| East Southeast | 10 " " |
| Other directions | 44 " " |

### Weather.

| | |
|---|---|
| Mean cloudiness observed, | 27 per cent. |
| Total cloudiness recorded by the Sun Thermometer, | 127 hrs.=34 per cent. |
| Number of clear days, | 12 |
| Number of fair days, | 13 |
| Number of cloudy days, | 5 |

### Bright Sunshine.

Number of hours recorded, . . 246 hrs=66%.

**Rain**, 3d, 6th, 24th, 25th, 27th, 28th, 29th, 30th.

**Frosts**, 28th, 29th.

**Thunder and Lightning**, 2d, 3d, 30th.

**Hail**, 28th.

**Gales**, 35 or more miles per hour: 36m, 7th, W.N.W.; 36m, 26th, N.: 47m, 28th, N.N;E.

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*Temperature in ground shelter.

† Reduced to freezing and sea-level.

# DAILY SUMMARY.

| Day. | Barometer Reduced to Sea Level. |  |  | Temperature. Ground Shelter. |  |  |  |  |  |  | No. Hours of Bright Sunshine. |
|---|---|---|---|---|---|---|---|---|---|---|---|
|  | Maximun. | Minimum. | Mean. Semi-daily. | Maximum | Time. | Minimum. | Time. | Mean of Max. and Min. | Mean Hourly Draper. | Mean Sensible Wet Bulb. |  |
| 1 | 30.09 | 29.93 | 30.017 | 85.0 | 2:30 P | 54.5 | 5:30 P | 69.7 | 70.6 | 66.0 | 8.6 |
| 2 | 29.97 | 29.84 | 29.892 | 90.0 | 4 P | 71.0 | 3 A | 80.5 | 78.7 | 73.7 | 8.4 |
| 3 | 29.97 | 29.87 | 29.912 | 82.0 | 2 P | 64.0 | 12 P | 73.0 | 73 2 | 69.0 | 8.9 |
| 4 | 30.00 | 29 84 | 29.920 | 73.0 | 12 M | 56.0 | 12 P | 65.5 | 64.2 | 58.0 | 4.9 |
| 5 | 30.12 | 30.00 | 30.082 | 74.0 | 4:30 P | 48.0 | 6:30 A | 61.0 | 60.9 | 55.0 | 11.1 |
| 6 | 30.08 | 29.82 | 29 967 | 74.5 | 2 P | 45.0 | 6 A | 59 7 | 61.1 | 56.0 | 5.7 |
| 7 | 29.89 | 29.71 | 29 811 | 79.0 | 2 P | 58.0 | 12 P | 68.5 | 68.3 | 60.3 | 9.1 |
| 8 | 30.12 | 29.87 | 30.053 | 63.5 | 3 P | 45.0 | 12 P | 54.3 | 55.5 | 47.3 | 5.9 |
| 9 | 30.24 | 30.12 | 30.199 | 60.0 | 1:30 P | 36.5 | 6 A | 48.3 | 50.0 | 45.7 | 7.0 |
| 10 | 30.24 | 30.13 | 30.199 | 65.0 | 2 P | 38.5 | 6 A | 51.7 | 52 0 | 45.7 | 7.5 |
| 11 | 30.20 | 30.13 | 30.193 | 63.5 | 3 P | 36.0 | 5:30 A | 49.7 | 50.0 | 46.0 | 5.2 |
| 12 | 30.35 | 30.20 | 30.304 | 68.0 | 2 P | 37.0 | 6 A | 52.5 | 52.6 | 47.3 | 8.3 |
| 13 | 30.51 | 30.35 | 30.469 | 72.0 | 3 P | 42.0 | 6 A | 57.0 | 56.0 | 50.0 | 11.1 |
| 14 | 30.53 | 30.40 | 30.478 | 76.5 | 3:30 P | 38.5 | 6 A | 57.5 | 56.6 | 48.0 | 11.0 |
| 15 | 30.44 | 30.30 | 30.383 | 79.0 | 3:30 P | 39.0 | 6 A | 59.0 | 58.3 | 50.3 | 10.6 |
| 16 | 30.43 | 30.33 | 30.387 | 84.5 | 4:30 P | 41.0 | 6 A | 62.7 | 60.5 | 51.0 | 10.6 |
| 17 | 30.37 | 30.22 | 30.299 | 85.0 | 4 P | 44.5 | 6 A | 64 7 | 63.0 | 52.7 | 10.5 |
| 18 | 30 22 | 30.04 | 30.135 | 87.0 | 3 P | 46.0 | 6 A | 66.5 | 67.2 | 57.0 | 10.3 |
| 19 | 30.16 | 30.07 | 30.148 | 80 0 | 3:30 P | 52.0 | 12 P | 66.0 | 64.3 | 55.3 | 9.6 |
| 20 | 30.17 | 30.00 | 30.101 | 83.0 | 2:30 P | 43.0 | 6 A | 63.0 | 62.0 | 54.0 | 9.7 |
| 21 | 30.11 | 29.98 | 30.063 | 93.0 | 3 P | 50.5 | 6 A | 71.7 | 68.9 | 60.0 | 10.5 |
| 22 | 30.06 | 29.89 | 29.969 | 96 5 | 3:30 P | 52.0 | 6 A | 74.2 | 71.5 | 62.3 | 10.2 |
| 23 | 29.92 | 29.74 | 29.837 | 92.5 | 3 P | 55 0 | 7 A | 73.7 | 72 8 | 64 0 | 9.3 |
| 24 | 29.87 | 29.69 | 29.808 | 84.5 | 2 P | 58.5 | 12 P | 71.5 | 68.2 | 61.0 | 6.9 |
| 25 | 30.00 | 29 85 | 29.967 | 67.0 | 2:30 P | 54.0 | 12 P | 60.5 | 59.0 | 54.0 | 4.7 |
| 26 | 30.15 | 29.98 | 30.085 | 61.5 | 2 P | 42.0 | 12 P | 51.7 | 51.7 | 41.7 | 10.5 |
| 27 | 30.26 | 30.01 | 30.147 | 64.0 | 12 M | 41.0 | 0:30 A | 52.5 | 49.6 | 41.7 | 4.0 |
| 28 | 30.38 | 30.26 | 30.342 | 56.0 | 1 P | 31.0 | 6 A | 43.5 | 42.0 | 36.3 | 4.5 |
| 29 | 30.41 | 30 04 | 30.267 | 64.0 | 3 P | 24.5 | 6 A | 44.3 | 44.0 | 36.5 | 9.5 |
| 30 | 30.07 | 29.85 | 29.960 | 65.0 | 1:30 P | 45.5 | 5 A | 55.3 | 52.9 | 47.3 | 2.4 |

# DAILY SUMMARY.

| Day. | Humidity. | | | Wind. | | | | | Precipitation. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Total in Inches. | |
| | Mean Dew Point. | Mean Force vapor. | Mean Relative Humidity. | Prevailing Direction. | Total Movement in Miles. | Maximum Pressure Per Square Ft | Miles per Hour. | Time. | Beginning. | Ending. | Rain.** | Snow. |
| 1 | 64.0 | .739 | 81.5 | S.W. | 97 | 1.5 | 17 | 2 P | | | | |
| 2 | 69.0 | .987 | 78.5 | S.W. | 187 | 1.0 | 14 | 9 P | | | | |
| 3 | 67.0 | .789 | 84.0 | N.W. | 89 | 0.0 | — | — | 10:30P | 11 P | .23 | |
| 4 | 53.5 | .583 | 72.5 | N. | 58 | 0.0 | — | — | | | | |
| 5 | 50.5 | .529 | 70.5 | S.W. | 59 | 0.0 | — | — | | | | |
| 6 | 54.5 | .507 | 86.5 | S.S.W. | 131 | 3.0 | 24 | 2 P | 5 P | 6 P | T | |
| 7 | 55.0 | .655 | 68.5 | W.N.W. | 249 | 6.5 | 36 | 2 P | | | | |
| 8 | 42.0 | .397 | 69.5 | N.N.W. | 200 | 3.0 | 24 | 3 A | | | | |
| 9 | 41.5 | .361 | 72.0 | N.N.E. | 138 | 4.5 | 30 | 10 A | | | | |
| 10 | 39.0 | .384 | 62.0 | N.N.E. | 120 | 1.0 | 14 | 5 P | | | | |
| 11 | 41.5 | .363 | 74.0 | N.E. | 67 | 0.0 | — | — | | | | |
| 12 | 42.5 | .393 | 70.5 | N.N.E. | 54 | 0.0 | — | — | | | | |
| 13 | 45.5 | .431 | 70.5 | E.N.E. | 75 | 0.0 | — | — | | | | |
| 14 | 42.5 | .411 | 73.5 | E.S.E. | 50 | 0.0 | — | — | | | | |
| 15 | 47.5 | .419 | 79.0 | E.S.E. | 36 | 0.0 | — | — | | | | |
| 16 | 49.0 | .415 | 86.0 | E.S.E. | 32 | 0.0 | — | — | | | | |
| 17 | 49.5 | .473 | 76.5 | E.N.E. | 64 | 0.0 | — | — | | | | |
| 18 | 53.0 | .591 | 70.5 | N.N.E. | 86 | 1.0 | 14 | 11 A | | | | |
| 19 | 51.5 | .521 | 74.0 | N. | 98 | 0.0 | — | — | | | | |
| 20 | 52.0 | .470 | 85.5 | S.W. | 46 | 0.5 | 10 | 3 P | | | | |
| 21 | 57.0 | .609 | 78.5 | W.NW. | 43 | 0.0 | — | — | | | | |
| 22 | 59.5 | .671 | 78.5 | W.S.W. | 22 | 0.0 | — | — | | | | |
| 23 | 61.5 | .734 | 78.0 | S. | 62 | 1.0 | 14 | 6 P | | | | |
| 24 | 58.5 | .606 | 82.0 | W. | 87 | 1.5 | 17 | 6 P | 11 P | 12 P | .03 | |
| 25 | 51.5 | .473 | 80.5 | N.N.E. | 83 | 0.0 | — | — | 0 A | 5 A | .08 | |
| 26 | 30.5 | .350 | 49.5 | N. | 266 | 6.5 | 36 | 11 A | | | | |
| 27 | 35.0 | .323 | 65.0 | N.N.W. | 210 | 4.5 | 30 | 12 M | | 1 P | T | |
| 28 | 29.5 | .247 | 68.0 | N.N.E. | 109 | 11.0 | 47 | 10 A | 10 A | 11 A | .03 | |
| 29 | 28.5 | .275 | 60.5 | N.E. | 40 | 0.0 | — | — | 7 P | 12 P | .04 | |
| 30 | 44.5 | .367 | 81.5 | N. | 134 | 2.0 | 20 | 3 P | 0 A | 2 P | .11 | |

**Rain or meltedsnow at base of tower. *Included in following day.

## REMARKS

During the month the most prominent features of the weather were the unusually small precipitation and large amount of sunshine. Variations in temperature were more noticeable than usual, many of the days showing a variation in temperature of more than 30 degrees and several exceeding 40 degrees. The monthly range of temperature was the largest September record since this station was established.

The mean barometer was unusually high, and the maximum and minimum records both considerably greater than usual at this time of year. The total wind movement was about ten per cent less than the normal, and wind from the Northeast quadrant much more frequent than usual. Gales were infrequent ; the heaviest lasted but a few minutes and was accompanied by a small amount of hail.

The mean temperature was about one degree lower than the normal, while the maximum was nearly ten degrees higher than the average Semtember maximum. The maximum temperature recorded on the 22d was the highest temperature for the year at this station. Unusually warm weather prevailed for four days beginning with the 21st.

The minimum temperature was about eight degrees below the normal and made a new minimum record for the month at this station. Frost was reported from the low lands in this vicinity on the 9th, 10th and 11th, but the first frost at the station occurred on the 28th. On the 29th a killing frost occurred and thin ice was formed in places.

The mean dew point and relative humidity were both considerably lower than usual.

The total precipitation was about one-eighth of the normal and the smallest September record at Amherst since 1865. For a period of three weeks, from the 3d to the 24th, not a measurable amount was recorded.

The sunshine record was unusually large, the number of hours noted being exceeded but twice in the past twenty-five years.

J. E. OSTRANDER, Meteorologist.

R. E. McLAIN, Observer.

BULLETIN No. 310. OCTOBER, 1914

# Meteorological Observations
AT THE
# MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.

*Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.*

*Height of Wind Instruments 72 ft.*

## MONTHLY SUMMARY.

### **Pressure.** In inches.

| | |
|---|---|
| Maximum reduced to freezing | 30.30, 14th, 10 A. |
| Minimum reduced to freezing | 29.31, 26th, 3 P. |
| Reduced[†] maximum reading | 30.60, 14th, 10 A. |
| Reduced[†] minimum reading | 29.60, 26th, 3 P. |
| Mean semi-daily reduced | 30.095 |
| Monthly range | 1.00 |

### [*]**Air Temperature.** In Degrees Fahr.

| | |
|---|---|
| Highest | 84.5, 3d, 4:30 P. |
| Lowest | 22.0, 28th, 2:30 A. |
| Mean hourly | 53.5 |
| Mean of means of max. and min. | 54.2 |
| Mean sensible (wet bulb) | 47.6 |
| Monthly range | 62.5 |
| Highest mean daily | 68.3, 11th |
| Lowest mean daily | 35.0, 27th |
| Mean maximum | 66.1 |
| Mean minimum | 42.2 |
| Mean daily range | 23.9 |
| Greatest daily range | 50.5, 3d |
| Least daily range | 4.5, 17th |

### **Humidity.**

| | |
|---|---|
| Mean dew point | 42.9 |
| Mean force of vapor | .393 |
| Mean relative humidity | 75.3 |

### **Precipitation.** In inches.

| | |
|---|---|
| Total precipitation | 2.09 |
| Number of days on which .01 inch or more rain fell | 5 |

### **Wind.**

| | |
|---|---|
| Total movement | 3612m. |
| Greatest daily movement | 306m., 27th |
| Least daily movement | 20m., 3d |
| Mean daily movement | 117 m |
| Mean hourly velocity | 4.9 m |

Maximum pressure per square foot, 6.5 lbs.= 36m. per hour, 27th, 10 A., N.W.

Maximum velocity for 5 minutes, 24m. per hour, 30th, 2:30 P., W.N.W.

Prevailing Direction, Southwest.

### Summary.

| | |
|---|---|
| North | 19 per cent. |
| South | 19 " " |
| Southwest | 16 " " |
| East | 10 " " |
| Other directions | 36 " " |

### **Weather.**

Mean cloudiness observed, . . . . 44 per cent.

Total cloudiness recorded by the Sun Thermometer, . . . . 177 hrs.=52 per cent.

| | |
|---|---|
| Number of clear days | 8 |
| Number of fair days | 10 |
| Number of cloudy days | 13 |

### **Bright Sunshine.**

Number of hours recorded. . . 164 hrs=48%.

**Rain** 9th, 16th, 17th, 18th, 19th, 24th, 27th, 29th, 30th.

**Snow**, 27th.

**Frosts**, 2d, 3d, 4th, 28th.

**Gales**, 35 or more miles per hour: 36m, 27th, N.W.

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[*]Temperature in ground shelter.

[†]Reduced to freezing and sea-level.

# DAILY SUMMARY.

| Day. | Barometer Reduced to Sea Level. | | | Temperature. Ground Shelter. | | | | | | | No. Hours of Bright Sunshine |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Maximun. | Minimum. | Mean. Semi-daily. | Maximum | Time. | Minimum. | Time. | Mean of Max. and Min. | Mean Hourly Draper. | Mean Sensible Wet Bulb. | |
| 1 | 30.27 | 30.07 | 30.225 | 66.5 | 2:30 P | 41.0 | 12 P | 53.7 | 52.5 | 46.7 | 3.5 |
| 2 | 30.34 | 30.21 | 30.312 | 77.5 | 3:30 P | 33.0 | 6 A | 55.3 | 52.2 | 44.0 | 9.5 |
| 3 | 30.26 | 30.06 | 30.192 | 84.5 | 4:30 P | 34.0 | 7 A | 59.3 | 55.7 | 44.0 | 9.8 |
| 4 | 30.18 | 30.06 | 30.143 | 82.5 | 3 P | 38.5 | 6 A | 60.5 | 59.1 | 52.7 | 9.4 |
| 5 | 30.12 | 29.99 | 30.067 | 81.0 | 3 P | 52.0 | 6 A | 66.5 | 64.5 | 55.7 | 8.3 |
| 6 | 30.30 | 30.05 | 30.259 | 61.0 | 12 M | 44.0 | 12 P | 52.5 | 53.8 | 50.7 | 0.0 |
| 7 | 30.30 | 30.10 | 30.211 | 59.5 | 4 P | 42.0 | 1 A | 50.7 | 50.5 | 44.3 | 0.2 |
| 8 | 30.10 | 29.96 | 30.018 | 77.0 | 3:30 P | 45.5 | 6:30 A | 61.3 | 58.9 | 51.7 | 8.0 |
| 9 | 30.13 | 29.93 | 30.099 | 78.0 | 3 P | 49.0 | 3:30 A | 63.5 | 61.4 | 57.0 | 5.9 |
| 10 | 30.13 | 29.98 | 30.061 | 77.0 | 3 P | 59.0 | 0 A | 68.0 | 66.0 | 61.7 | 1.6 |
| 11 | 29.98 | 29.81 | 29.897 | 80.5 | 3:30 P | 61.0 | 12 P | 70.7 | 68.3 | 61.7 | 3.8 |
| 12 | 30.14 | 29.93 | 30.037 | 70.5 | 1 P | 50.5 | 5 A | 60.5 | 59.6 | 54.5 | 8.7 |
| 13 | 30.50 | 30.14 | 30.395 | 60.5 | 3:30 P | 37.0 | 12 P | 48.7 | 49.8 | 41.7 | 7.1 |
| 14 | 30.60 | 30.44 | 30.541 | 57.0 | 1:30 P | 31.0 | 6 A | 44.0 | 45.5 | 40.0 | 3.3 |
| 15 | 30.44 | 30.08 | 30.242 | 69.5 | 12:30 P | 44.0 | 6:30 A | 56.7 | 57.3 | 52.0 | 6.1 |
| 16 | 30.08 | 29.96 | 30.015 | 64.0 | 3:30 P | 59.0 | 12 P | 61.5 | 62.0 | 61.0 | 0.0 |
| 17 | 29.96 | 29.80 | 29.848 | 61.0 | 6 P | 56.5 | 12 P | 58.7 | 58.4 | 57.7 | 0.0 |
| 18 | 29.91 | 29.84 | 29.885 | 70.0 | 3:30 P | 54.0 | 7:30 A | 62.0 | 57.2 | 53.3 | 4.0 |
| 19 | 30.09 | 29.89 | 29.973 | 63.5 | 1 P | 52.0 | 0:30 A | 57.7 | 57.2 | 54.5 | 2.7 |
| 20 | 30.26 | 30.09 | 30.229 | 71.0 | 3 P | 44.0 | 6 A | 57.5 | 55.1 | 49.3 | 8.8 |
| 21 | 30.26 | 30.04 | 30.155 | 76.0 | 2:30 P | 39.0 | 5 A | 57.5 | 57.4 | 49.7 | 6.9 |
| 22 | 30.38 | 30.04 | 30.255 | 70.5 | 1:30 P | 44.0 | 12 P | 57.3 | 59.0 | 46.7 | 9.5 |
| 23 | 30.54 | 30.22 | 30.425 | 57.0 | 3 P | 32.5 | 6:30 A | 44.7 | 44.8 | 38.5 | 9.1 |
| 24 | 30.22 | 29.98 | 30.077 | 60.0 | 3 P | 40.0 | 3 A | 50.0 | 48.3 | 44.3 | 0.4 |
| 25 | 30.13 | 29.81 | 29.997 | 60.0 | 3 P | 29.5 | 7:30 P | 44.7 | 45.2 | 37.0 | 8.8 |
| 26 | 29.81 | 29.60 | 29.689 | 61.0 | 1:30 P | 42.5 | 7 A | 51.7 | 51.2 | 44.7 | 6.8 |
| 27 | 29.99 | 29.66 | 29.885 | 44.0 | 0 A | 24.0 | 12 P | 34.0 | 35.0 | 27.7 | 4.4 |
| 28 | 30.03 | 29.89 | 29.990 | 52.0 | 2 P | 22.0 | 2:30 A | 37.0 | 38.6 | 30.0 | 6.6 |
| 29 | 30.03 | 29.81 | 29.961 | 53.5 | 2 P | 34.0 | 6 A | 43.7 | 45.2 | 39.3 | 1.6 |
| 30 | 29.87 | 29.74 | 29.813 | 51.0 | 2:30 P | 40.0 | 12 P | 45.5 | 43.8 | 38.7 | 0.4 |
| 31 | 30.05 | 29.87 | 30.041 | 53.5 | 2 P | 34.0 | 7 A | 43.7 | 43.5 | 35.0 | 8.8 |

# DAILY SUMMARY.

| Day. | Humidity. | | | Wind. | | | | | Precipitation. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Total in Inches. | |
| | Mean Dew Point. | Mean Force vapor. | Mean Relative Humidity. | Prevailing Direction. | Total Movement in Miles. | Maximum Pressure Per Square Ft | Miles per Hour. | Time. | Beginning. | Ending. | Rain.** | Snow. |
| 1 | 43.5 | .359 | 80.5 | N. | 142 | 1.0 | 14 | 10 A | | | | |
| 2 | 41.0 | .331 | 82.5 | N.N.W. | 43 | 2.0 | 20 | 10 A | | | | |
| 3 | 39.0 | .347 | 71.5 | N. | 20 | 0.0 | — | — | | | | |
| 4 | 50.0 | .463 | 80.0 | E. | 36 | 0.0 | — | — | | | | |
| 5 | 53.0 | .517 | 78.0 | S.W. | 101 | 0.5 | 10 | 11 A | | | | |
| 6 | 47.5 | .425 | 77.5 | E.S.E. | 63 | 0.0 | — | — | | | | |
| 7 | 38.0 | .349 | 66.5 | S.S.E. | 83 | 0.5 | 10 | 11 A | | | | |
| 8 | 49.0 | .442 | 82.0 | S. | 53 | 0.0 | — | — | | | | |
| 9 | 55.5 | .503 | 90 5 | S. | 104 | 2.5 | 22 | 8 P | 7 A | | T | |
| 10 | 60.0 | .607 | 86.0 | S. | 225 | 3.5 | 26 | 1 P | | | | |
| 11 | 58.5 | .665 | 73.5 | S. | 221 | 3.5 | 26 | 12 M | | | | |
| 12 | 51.0 | .497 | 76.0 | W.N.W. | 141 | 3.5 | 26 | 4 P | | | | |
| 13 | 35.0 | .391 | 64.5 | N. | 111 | 0.0 | — | — | | | | |
| 14 | 34.0 | .298 | 67.5 | E. | 49 | 0.0 | — | — | | | | |
| 15 | 49.0 | .452 | 78.5 | S.E. | 44 | 0.0 | — | — | | | | |
| 16 | 60.0 | .561 | 93.0 | S.W. | 30 | 0.0 | — | — | 3 A | 12 P | .64 | |
| 17 | 56.5 | .491 | 95.5 | N. | 110 | 2.5 | 22 | 6 P | 0 A | 2 P | .81 | |
| 18 | 52.0 | .425 | 92.5 | S. | 57 | 0.0 | — | — | 8 A | | T | |
| 19 | 53.5 | .451 | 89.5 | S.W. | 53 | 0.0 | — | — | 2 A | 12 M | .42 | |
| 20 | 47.5 | .373 | 88.5 | S.S.E. | 32 | 0.0 | — | — | | | | |
| 21 | 46.0 | .455 | 76.5 | S.W. | 77 | 1.5 | 17 | 2 P | | | | |
| 22 | 37.0 | .439 | 51.0 | N. | 185 | 4.0 | 28 | 11 P | | | | |
| 23 | 32.0 | .274 | 67.5 | W. | 135 | 2.0 | 20 | 11 P | | | | |
| 24 | 41.0 | .327 | 79.0 | E. | 172 | 2.5 | 22 | 9 P | 11 A | | T | |
| 25 | 31.0 | .265 | 70.0 | N. | 95 | 0.0 | — | — | | | | |
| 26 | 40.0 | .345 | 73.5 | W.S.W. | 140 | 3.0 | 24 | 12 P | | | | |
| 27 | 19.5 | .180 | 60.0 | N.W. | 306 | 6 5 | 36 | 10 A | 5 A | 10 A | T | T |
| 28 | 17.5 | .216 | 49.5 | S.W. | 190 | 3.0 | 24 | 2 P | | | | |
| 29 | 33.0 | .289 | 66 5 | S. | 164 | 4.5 | 30 | 10 P | 9 P | 12 P | .17 | |
| 30 | 33 5 | .269 | 73.5 | W.N.W. | 207 | 5.5 | 33 | 3 P | 0 A | 10 A | .05 | |
| 31 | 25.5 | .253 | 54.0 | N.W. | 223 | 4.0 | 28 | 12 M | | | | |

**Rain or melted snow at base of tower. *Included in following day.

## REMARKS

The weather during the month was generally seasonable and more than usually pleasant. A measurable amount of precipitation was recorded on only five days, and the drought which prevailed during the preceding month was not broken until the 16th, when a fairly heavy rainstorm occurred. A few light rains were noted later in the month, but the total rainfall was less than 60 per cent of the normal for October.

The records of the several weather elements, compared with the normals for this station, show the following features: The mean barometer was considerably higher than the normal, and the range comparatively small. The mean daily barometer fell below 30 inches but once during the first half of the month—the period which was without precipitation. The maximum and minimum pressures were not far from the normal values for these features. The total wind movement was about 90 per cent of the normal, and an unusually large per cent of the total was from the southwest quadrant. The pressure chart showed but a single gale, and that was a light one.

The mean hourly temperature was more than 3 degrees above the normal, and, excepting last year, was the warmest October since 1900.

The maximum temperature was more than 5 degrees higher than usual, while the minimum record was practically normal. The daily range of more than 50 degrees, on the 3d, was exceptionally large for this locality.

The mean dew point was slightly higher than usual and the relative humidity was practically normal.

The precipitation, already commented on, nearly all occurred during four days near the middle of the month. Notwithstanding the small precipitation the amount of cloudiness was nearly normal. The mornings, however, were much more cloudy than the evenings.

J. E. OSTRANDER, Meteorologist.

R. E. McLAIN, Observer.

BULLETIN No. 311. NOVEMBER, 1914

# Meteorological Observations
AT THE
# MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.
*Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.*
*Height of Wind Instruments 72 ft.*

## MONTHLY SUMMARY.

### Pressure. In inches.

| | |
|---|---|
| Maximum reduced to freezing, | 30.47, 29th, 10 A. |
| Minimum reduced to freezing, | 29.15, 20th, 1 P. |
| Reduced† maximum reading, | 30.78, 29th, 10 A. |
| Reduced† minimum reading, | 29.46, 20th, 1 P. |
| Mean semi-daily reduced, | 30.066 |
| Monthly range, | 1.32 |

### *Air Temperature. In Degrees Fahr.

| | |
|---|---|
| Highest, | 71.5, 1st, 2:30 P. |
| Lowest, | 4.5, 24th, 6 A. |
| Mean hourly, | 37.0 |
| Mean of means of max. and min., | 37.6 |
| Mean sensible (wet bulb), | 31.5 |
| Monthly range, | 67.0 |
| Highest mean daily, | 51.6, 4th |
| Lowest mean daily, | 21.0, 23d |
| Mean maximum, | 47.5 |
| Mean minimum, | 27.6 |
| Mean daily range, | 19.8 |
| Greatest daily range, | 37.5, 1st |
| Least daily range, | 8.5, 19th |

### Humidity.

| | |
|---|---|
| Mean dew point, | 25.7 |
| Mean force of vapor, | .215 |
| Mean relative humidity, | 69.6 |

### Precipitation. In inches.

| | |
|---|---|
| Total precipitation, | 2.62 |
| Number of days on which .01 inch or more rain fell | 7 |
| Total snow in inches | 5¾ |

*Temperature in ground shelter.
† Reduced to freezing and sea-level.

### Wind.

| | |
|---|---|
| Total movement, | 5280m. |
| Greatest daily movement, | 378m., 17th |
| Least daily movement, | 15m., 30th |
| Mean daily movement, | 176.m |
| Mean hourly velocity, | 7.3 m |

Maximum pressure per square foot, 18.5 lbs.= 61m. per hour, 13th, 3 P., S.S.W.
Maximum velocity for 5 minutes, 40m. per hour, 13th, 2 P., S.S.W.
Prevailing Direction, West Southwest.

### Summary.

| | |
|---|---|
| West | 23 per cent. |
| West Southwest | 13 " " |
| South | 10 " " |
| South Southwest | 10 " " |
| Southwest | 10 " " |
| Northwest | 10 " " |
| Other directions | 24 " " |

### Weather.

Mean cloudiness observed, 41 per cent.
Total cloudiness recorded by the Sun Thermometer, 180 hrs.=62 per cent.

| | |
|---|---|
| Number of clear days, | 3 |
| Number of fair days, | 10 |
| Number of cloudy days, | 17 |

### Bright Sunshine.

Number of hours recorded, 113 hrs=38%.

**Rain,** 2d, 3d, 5th, 7th, 8th, 13th, 15th, 16th, 19th.

**Snow,** 11th, 17th, .19th, 20th, 23d

**Gales,** 35 or more miles per hour: 45m, 2d, W.N.W.; 44m, 4th, W.S.W.; 35m, 5th, W. N. W.; 61m, 13th, S.S.W.; 37th, 14th, W.; 41m, 15th, E.S.E.; 59m, 17th, W.; 41m, 19th, N.

# DAILY SUMMARY.

| Day. | Barometer Reduced to Sea Level. |  |  | Temperature. Ground Shelter. |  |  |  |  |  |  | No. Hours of Bright Sunshine. |
|---|---|---|---|---|---|---|---|---|---|---|---|
|  | Maximun. | Minimum. | Mean. Semi-daily. | Maximum. | Time. | Minimum. | Time. | Mean of Max. and Min. | Mean Hourly Draper. | Mean Sensible Wet Bulb. |  |
| 1 | 30.04 | 29.77 | 29.931 | 71.5 | 2:30 P | 34.0 | 5 A | 52.7 | 51.3 | 40.3 | 7.2 |
| 2 | 29.84 | 29.64 | 29.745 | 59.0 | 12 M | 42.5 | 12 P | 50.7 | 48.8 | 42.3 | 1.6 |
| 3 | 29.98 | 29.81 | 29.919 | 58.0 | 2:30 P | 34.0 | 7:30 A | 46.0 | 45.3 | 39.0 | 7.6 |
| 4 | 29.85 | 29.56 | 29.765 | 71.0 | 2 P | 35.0 | 7 A | 53.0 | 51.6 | 40.5 | 6.2 |
| 5 | 29.79 | 29.69 | 29.773 | 56.5 | 11:30 A | 41.0 | 12 P | 48.7 | 46.6 | 40.7 | 3.5 |
| 6 | 30.13 | 29.78 | 29.987 | 49 0 | 1:30 P | 34.0 | 6 A | 41.5 | 41.1 | 36.3 | 1.1 |
| 7 | 30.25 | 29.92 | 30.135 | 48.0 | 1 P | 36.0 | 6 A | 42.0 | 42.0 | 37.5 | 5.4 |
| 8 | 29.92 | 29.78 | 29.867 | 52.5 | 1:30 P | 38.0 | 7:30 A | 45.3 | 43.9 | 38.7 | 0.1 |
| 9 | 30.07 | 29.86 | 30.027 | 41.0 | 1 P | 29.0 | 12 P | 35.0 | 34.3 | 28.0 | 6.2 |
| 10 | 30.12 | 30.02 | 30.095 | 40.0 | 2 P | 22.0 | 7 A | 31.0 | 29.1 | 23.3 | 8.1 |
| 11 | 30.05 | 29.87 | 29.951 | 51.0 | 3:30 P | 24.0 | 0 A | 37.5 | 36.0 | 31.7 | 2.3 |
| 12 | 30.24 | 30.00 | 30.155 | 48.5 | 2:30 P | 27.0 | 7:30 A | 37.7 | 37.0 | 30.7 | 2.7 |
| 13 | 30.24 | 29.74 | 30.003 | 61.0 | 1 P | 28.5 | 3 A | 44.7 | 42.8 | 38.0 | 2.2 |
| 14 | 30.43 | 30.05 | 30.294 | 48.0 | 3:30 P | 29 0 | 12 P | 38.5 | 39.6 | 31.7 | 7.0 |
| 15 | 30.44 | 29.60 | 30.121 | 54.0 | 12 P | 25.0 | 6 A | 39.5 | 36.7 | 36 5 | 0.0 |
| 16 | 29.87 | 29.47 | 29.633 | 60 5 | 2 A | 34.0 | 12 P | 47.3 | 49.3 | 45.0 | 0.0 |
| 17 | 30.22 | 29.87 | 30.080 | 37.5 | 12:30 P | 26.5 | 12 P | 32.0 | 31.3 | 26.0 | 3.0 |
| 18 | 30.53 | 30.22 | 30.510 | 29.5 | 1 P | 19.5 | 6:30 A | 24.5 | 24.9 | 20.0 | 3 6 |
| 19 | 30.47 | 29.74 | 30.159 | 34.0 | 9 P | 25.5 | 0 A | 29.7 | 28.4 | 28.0 | 0.0 |
| 20 | 29.74 | 29.46 | 29.551 | 35 5 | 3:30 P | 25.5 | 9 P | 30.5 | 30.7 | 27.3 | 0.6 |
| 21 | 29.86 | 29.59 | 29.776 | 34.5 | 3:30 P | 22.5 | 11 P | 28.5 | 27.1 | 20.0 | 3.1 |
| 22 | 30.07 | 29.86 | 29.977 | 37.5 | 3 P | 18.0 | 4:30 A | 27.7 | 28.1 | 23.5 | 0.7 |
| 23 | 30.50 | 30.07 | 30.333 | 29.5 | 12 M | 14.0 | 12 P | 21.7 | 21.0 | 18.0 | 5.5 |
| 24 | 30.59 | 30.24 | 30.461 | 36.0 | 2 P | 4.5 | 6 A | 20.3 | 21.2 | 16.0 | 7.3 |
| 25 | 30.24 | 29.92 | 30.055 | 44.0 | 4 P | 28.0 | 6 A | 36.0 | 36.6 | 32.3 | 4.3 |
| 26 | 29.92 | 29.71 | 29 804 | 53.0 | 2:30 P | 35.5 | 6 A | 44.3 | 44.2 | 37.7 | 6.0 |
| 27 | 30.35 | 29.71 | 30.002 | 52.5 | 11 A | 32.0 | 12 P | 42.3 | 45.6 | 38.0 | 0.0 |
| 28 | 30.69 | 30.35 | 30.626 | 41.5 | 4 P | 21.5 | 7:30 A | 31.5 | 29.8 | 21.7 | 8.0 |
| 29 | 30.78 | 30.64 | 30.705 | 48.5 | 3 P | 17.5 | 7:30 A | 33.0 | 30.2 | 24.7 | 8.8 |
| 30 | 30.67 | 30.41 | 30.533 | 41.5 | 3 P | 27.5 | 0:30 A | 34.5 | 34.5 | 32.3 | 1.0 |

# DAILY SUMMARY.

| | Humidity. | | | Wind. | | | | | Precipitation. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Total in Inches. | |
| Day. | Mean Dew Point. | Mean Force vapor. | Mean Relative Humidity. | Prevailing Direction. | Total Movement in Miles. | Maximum Pressure Per Square Ft | Miles per Hour. | Time. | Beginning. | Ending. | Rain.** | Snow. |
| 1 | 32.0 | .331 | 57.5 | S. | 138 | 2.5 | 22 | 4 P | | | | |
| 2 | 38.5 | .301 | 78.0 | W. | 259 | 10.0 | 45 | 2 P | 4 A | 12 M | .12 | |
| 3 | 33.0 | .289 | 67.0 | W.S.W. | 154 | 1.0 | 14 | 7 P | 5 P | | T | |
| 4 | 35.5 | .309 | 74.0 | S.W. | 229 | 9.5 | 44 | 4 P | | | | |
| 5 | 35.0 | .301 | 67.5 | W. | 235 | 6.0 | 35 | 1 P | 1 P | 4 P | T | |
| 6 | 31.5 | .243 | 73.5 | N.W. | 169 | 2.5 | 22 | 10 A | | | | |
| 7 | 32.5 | .261 | 71.0 | W. | 118 | 3.0 | 24 | 9 P | 7 P | | T | |
| 8 | 36.0 | .248 | 88.0 | E.N.E. | 177 | 4.0 | 28 | 1 A | 6 P | 12 P | .22 | |
| 9 | 20.0 | .179 | 62.5 | N.N.W. | 249 | 4.5 | 30 | 7 A | | | | |
| 10 | 15.0 | .143 | 62.5 | N.W. | 142 | 1.5 | 17 | 9 A | | | | |
| 11 | 29.5 | .205 | 75.5 | S.W. | 70 | 0.5 | 10 | 3 P | 5 A | | T | T |
| 12 | 24.5 | .197 | 67.5 | W.S.W. | 156 | 3.0 | 24 | 12 M | | | | |
| 13 | 33.0 | .279 | 72.5 | S.S.W. | 228 | 18.5 | 61 | 3 P | 6 P | 7 P | .02 | |
| 14 | 21.0 | .221 | 53.0 | N.W. | 258 | 7.0 | 37 | 1 A | | | | |
| 15 | 33.5 | .240 | 84.0 | E. | 70 | 8.5 | 41 | 9 P | 1 P | 12 P | .88 | |
| 16 | 40.0 | .358 | 75.0 | W. | 323 | 5.5 | 33 | 5 P | 0 A | 10 A | .63 | |
| 17 | 17.5 | .163 | 60.5 | W. | 378 | 17.5 | 59 | 1 P | 4 P | | T | T |
| 18 | 10.0 | .127 | 56.0 | W.S.W. | 195 | 3.0 | 24 | 3 A | | | | |
| 19 | 25.0 | .163 | 83.0 | N.N.E. | 127 | 8.5 | 41 | 12 P | 8 A | 12 P | .67 | *4.25 |
| 20 | 24.0 | .157 | 85.5 | N.N.W. | 192 | 5.5 | 33 | 1 A | 0 A | 10 A | .08 | 1.5 |
| 21 | 5.5 | .129 | 50.5 | W.S.W. | 162 | 2.5 | 22 | 0 A | | | | |
| 22 | 19.0 | .155 | 46.5 | S.W. | 195 | 4.0 | 28 | 12 M | | | | |
| 23 | 12.5 | .111 | 71.5 | N.W. | 187 | 4.5 | 30 | 2 P | 11 A | 12 M | T | T |
| 24 | 10.5 | .109 | 73.0 | S. | 122 | 5.0 | 32 | 9 P | | | | |
| 25 | 25.5 | .215 | 67.0 | S.S.W. | 203 | 3.0 | 24 | 9 A | | | | |
| 26 | 31.0 | .273 | 63.0 | S.S.W. | 203 | 3.0 | 24 | 10 P | | | | |
| 27 | 32.5 | .270 | 68.5 | W. | 227 | 4.5 | 30 | 8 P | | | | |
| 28 | 13.5 | .135 | 63.0 | N. | 77 | 0.0 | — | — | | | | |
| 29 | 22.0 | .147 | 79.5 | E. | 22 | 0.5 | 10 | 1 P | | | | |
| 30 | 31.0 | .193 | 92.5 | S. | 15 | 0.0 | — | — | | | | |

**Rain or meltedsnow at base of tower. *Included in following day.

## REMARKS

The weather during the month was generally seasonable and presented few unusual features of interest. Nearly all the precipitation occured near the middle of the month and the wind movement was most marked at about the same time. A snowfall of nearly six inches on the 19th, 20th, was the last precipitation of any importance and traces of it remained on the ground when the month closed. During the last week of the month some rather low temperatures were registered.

A study of the separate records of the several weather elements shows the following features: The mean barometer was slightly higher than the normal and the range of pressure nearly the average amount for November. The maximum barometer, on the 29th, was the highest November record since 1896. The maximum pressure was also much higher than the normal value for that feature.

The total wind movement was considerably more than usual and a comparatively large number of gales was registered.

The mean temperature was about two and one-half degrees below the normal, owing largely to the low temperatures for a few days near the end of the month. The maximum temperature was considerably higher than usual while the minimum was the lowest November record since 1891, giving a range about one-third more than usual. The mean hourly temperatures for the 23d and 24th were extremely low for the time of year.

The mean dew point and relative humidity were both several points lower than the normal values for these elements.

The total precipitation was about five-sixths of the normal and nearly all of it occurred during two well defined storms.

J. E. OSTRANDER, Meteorologist.

R. E. McLAIN, Observer.

BULLETIN No. 312. DECEMBER, 1914

# Meteorological Observations
AT THE
# MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.
*Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.*
*Height of Wind Instruments 72 ft.*

## MONTHLY SUMMARY.

### **Pressure.** In inches.

| | |
|---|---|
| Maximum reduced to freezing, | 30 36, 26th, 11 P. |
| Minimum reduced to freezing, | 28.86, 14th, 5 A. |
| Reduced† maximum reading, | 30.69, 26th, 11 P. |
| Reduced† minimum reading, | 29.17, 14th, 5 A. |
| Mean semi-daily reduced, | 30.177 |
| Monthly range, | 1.52 |

### ***Air Temperature.** In Degrees Fahr.

| | |
|---|---|
| Highest, | 58.5, 3d, 2 P. |
| Lowest, | -18.5, 27th, 6 A. |
| Mean hourly, | 24.2 |
| Mean of means of max. and min., | 24.7 |
| Mean sensible (wet bulb), | 20 7 |
| Monthly range, | 77.0 |
| Highest mean daily, | 47.5, 3d |
| Lowest mean daily, | -6.0, 27th |
| Mean maximum, | 33.2 |
| Mean minimum, | 16.2 |
| Mean daily range, | 17.0 |
| Greatest daily range, | 30.5, 28th |
| Least daily range, | 3.5, 9th |

### **Humidity.**

| | |
|---|---|
| Mean dew point, | 14.5 |
| Mean force of vapor, | .140 |
| Mean relative humidity, | 73.2 |

### **Precipitation.** In inches.

| | |
|---|---|
| Total precipitation, | 2.89 |
| Number of days on which .01 inch or more rain fell | 8 |
| Total snow in inches | 5.5 |

* Temperature in ground shelter.
† Reduced to freezing and sea-level.

### **Wind.**

| | |
|---|---|
| Total movement, | 4705m. |
| Greatest daily movement, | 425m., 22d |
| Least daily movement, | 1m., 28th |
| Mean daily movement, | 152 m |
| Mean hourly velocity, | 6.3 m |

Maximum pressure per square foot, 12.0 lbs.= 49m. per hour, 21st, 8 P., W.N.W.
Maximum velocity for 5 minutes, 36m. per hour, 30th, 5 P., N.W.
Prevailing Direction, West Northwest.

### Summary.

| | |
|---|---|
| North Northeast | 26 per cent. |
| West | 16 " " |
| North | 10 " " |
| West Southwest | 10 " " |
| North Northwest | 10 " " |
| Other directions | 28 " " |

### **Weather.**

| | |
|---|---|
| Mean cloudiness observed, | 54 per cent. |
| Total cloudiness recorded by the Sun Thermometer, | 123 hrs.=43 per cent. |
| Number of clear days, | 11 |
| Number of fair days, | 10 |
| Number of cloudy days, | 10 |

### **Bright Sunshine.**

Number of hours recorded, 160 hrs=57%.
**Rain**, 7th, 8th, 13th, 14th, 19th, 20th, 29th.
**Snow**, 7th, 10th, 13th, 14th, 19th, 20th, 22d, 23d, 24th, 27th.
**Days of Sleighing**, 11.
**Gales**, 35 or more miles per hour: 38m, 7th, N.N E.; 45m, 14th, W.N.W.; 38m, 15th, W.S.W.; 39m, 20th, N.W.; 49m, 21st, W. N. W.; 42m, 22d, N.W.; 45m, 30th, N.W.

# DAILY SUMMARY.

| Day. | Barometer Reduced to Sea Level. |  |  | Temperature. Ground Shelter. |  |  |  |  |  |  | No. Hours of Bright Sunshine. |
|---|---|---|---|---|---|---|---|---|---|---|---|
|  | Maximun. | Minimum. | Mean. Semi-daily. | Maximum | Time. | Minimum. | Time. | Mean of Max. and Min. | Mean Hourly Draper. | Mean Sensible Wet Bulb. |  |
| 1 | 30.41 | 30.24 | 30.299 | 57.0 | 3 P | 31.0 | 2 A | 44.0 | 40.1 | 37.0 | 5.9 |
| 2 | 30.24 | 30.07 | 30.145 | 50.0 | 10 P | 31.5 | 2 A | 40.7 | 40.9 | 40.7 | 0.1 |
| 3 | 30.34 | 30.07 | 30.197 | 58.5 | 2 P | 37.0 | 12 P | 47.7 | 47.5 | 43.5 | 6.4 |
| 4 | 30.49 | 30.34 | 30.465 | 46.5 | 3:30 P | 33.0 | 7 A | 39.7 | 36.3 | 30.7 | 6.4 |
| 5 | 30.56 | 30.46 | 30.565 | 37.0 | 12 M | 26.0 | 12 P | 31.5 | 30.3 | 24.3 | 5.2 |
| 6 | 30.54 | 30.37 | 30.489 | 33.5 | 9 P | 26.0 | 0 A | 29.7 | 30.6 | 27.3 | 0.0 |
| 7 | 30.37 | 29.86 | 30.065 | 32.0 | 12 M | 29.5 | 5 A | 30.7 | 30.8 | 29.7 | 0.0 |
| 8 | 30.07 | 29.80 | 29.921 | 35.5 | 4 P | 30.0 | 1 A | 32.7 | 32.8 | 28.5 | 0.0 |
| 9 | 30.26 | 30.07 | 30.219 | 30.0 | 3:30 P | 26.5 | 9 A | 28.3 | 28.3 | 24.7 | 1.7 |
| 10 | 30.18 | 29.98 | 30.055 | 37.5 | 3:30 P | 25.0 | 8 A | 31.3 | 28.7 | 25.0 | 7.5 |
| 11 | 30.11 | 29.98 | 30.055 | 39.0 | 2 P | 24.0 | 12 P | 31.5 | 30.0 | 27.5 | 7.3 |
| 12 | 30.24 | 30.11 | 30.216 | 38.0 | 2 P | 20.0 | 12 P | 29.0 | 25.8 | 21.3 | 8.3 |
| 13 | 30.28 | 29.34 | 29.989 | 38.0 | 12 P | 14.5 | 6:30 A | 26.3 | 25.4 | 24.3 | 2.2 |
| 14 | 29.78 | 29.17 | 29.521 | 39.0 | 1 A | 18.0 | 12 P | 28.5 | 30.9 | 25.0 | 1.6 |
| 15 | 30.20 | 29.78 | 30.049 | 22.5 | 2 P | 12.0 | 7:30 A | 17.3 | 17.3 | 13.0 | 7.8 |
| 16 | 30.42 | 30.20 | 30.395 | 28.5 | 1:30 P | 15.0 | 12 P | 21.7 | 20.0 | 16.5 | 7.4 |
| 17 | 30.51 | 30.40 | 30.496 | 28.5 | 3:30 P | 13.0 | 7:30 A | 20.7 | 17.8 | 13.3 | 8.3 |
| 18 | 30.51 | 30.41 | 30.471 | 30.0 | 3:30 P | 5.5 | 7:30 A | 17.7 | 16.7 | 16.5 | 8.4 |
| 19 | 30.41 | 29.91 | 30.121 | 37.0 | 8 P | 14.0 | 3 A | 25.5 | 27.1 | 26.5 | 1.8 |
| 20 | 30.41 | 29.91 | 30.298 | 39.0 | 1:30 A | 23.0 | 12 P | 31.0 | 30.5 | 25.5 | 8.5 |
| 21 | 30.39 | 29.63 | 29.909 | 35.5 | 7:30 P | 21.5 | 9:30 A | 28.5 | 25.4 | 25.3 | 0.3 |
| 22 | 29.91 | 29.75 | 29.874 | 28.5 | 12 M | 16.0 | 12 P | 22.3 | 23.0 | 18.0 | 8.2 |
| 23 | 30.20 | 29.91 | 30.056 | 20.5 | 1:30 P | 5.0 | 6 A | 12.7 | 13.2 | 8.3 | 6.8 |
| 24 | 30.26 | 29.91 | 30.090 | 20.0 | 10 P | −0.5 | 7 A | 9.7 | 12.1 | 9.7 | 5.3 |
| 25 | 30.23 | 29.90 | 30.151 | 15.0 | 1:30 P | 2.0 | 12 P | 8.5 | 10.3 | 6.7 | 6.5 |
| 26 | 30.69 | 30.23 | 30.537 | 13.5 | 3 P | −16.0 | 7:30 A | −1.3 | −4.5 | −12.0 | 8.5 |
| 27 | 30.67 | 30.30 | 30.438 | 9.0 | 3 P | −18.5 | 6 A | −4.7 | −6.0 | −10.0 | 7.9 |
| 28 | 30.45 | 30.29 | 30.383 | 25.5 | 2 P | −5.0 | 1:30 A | 10.3 | 10.2 | 7.7 | 6.5 |
| 29 | 30.29 | 29.56 | 29.913 | 31.0 | 12 P | 8.0 | 3:30 A | 19.5 | 27.1 | 23.3 | 1.2 |
| 30 | 30.11 | 29.51 | 29.787 | 43.0 | 12:30 P | 22.5 | 12 P | 32.7 | 33.8 | 30.5 | 6.7 |
| 31 | 30.37 | 30.11 | 30.328 | 30.0 | 4 P | 12.0 | 12 P | 21.0 | 19.3 | 14.7 | 7.5 |

# DAILY SUMMARY.

| Day. | Humidity. | | | Wind. | | | | | Precipitation. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Mean Dew Point. | Mean Force vapor. | Mean Relative Humidity. | Prevailing Direction. | Total Movement in Miles. | Maximum Pressure Per Square Ft | Miles per Hour. | Time. | Beginning. | Ending. | Total in Inches. | |
| | | | | | | | | | | | Rain.** | Snow. |
| 1 | 35.5 | .229 | 93.5 | S. | 21 | 0.5 | 10 | 12 M | | | | |
| 2 | 38.5 | .273 | 90.0 | W.S.W. | 24 | 0.0 | — | — | | | | |
| 3 | 41.0 | .307 | 86.0 | N.N.W. | 99 | 2.5 | 22 | 2 P | | | | |
| 4 | 24.0 | .201 | 65.5 | N. | 262 | 3.5 | 26 | 8 A | | | | |
| 5 | 16.0 | .151 | 63.0 | N.N.E. | 206 | 1.5 | 17 | 9 A | | | | |
| 6 | 21.5 | .167 | 71.0 | N.N.E. | 293 | 3.0 | 24 | 1 P | | | | |
| 7 | 27.5 | .171 | 90.0 | N.N.E. | 382 | 7.0 | 38 | 9 P | 11 A | 12 P | .43 | 1.0 |
| 8 | 20.0 | .185 | 61.0 | N.N.E. | 232 | 4.5 | 30 | 1 A | 0 A | 10 A | .14 | |
| 9 | 19.0 | .149 | 71.5 | N.N.E. | 168 | 0.5 | 10 | 4 P | | | | |
| 10 | 21.5 | .143 | 85.0 | N. | 144 | 1.5 | 17 | 8 A | 7 A | 10 P | T | T |
| 11 | 23.5 | .159 | 83.5 | N.W. | 55 | 1.5 | 17 | 4 P | | | | |
| 12 | 17.0 | .177 | 77.5 | N. | 56 | 0.0 | — | — | | | | |
| 13 | 22.5 | .144 | 90.0 | N.N.E. | 32 | 2.0 | 20 | 7 P | 4 P | 12 P | .55 | .25 |
| 14 | 17.0 | .161 | 62.0 | W. | 350 | 10.0 | 45 | 5:30P | 0 A | 12:30P | .55 | T |
| 15 | 4.0 | .090 | 62.0 | W.S.W. | 346 | 7.0 | 38 | 12 M | | | | |
| 16 | 6.5 | .106 | 60.0 | W.S.W. | 181 | 3.5 | 26 | 4 P | | | | |
| 17 | 5.0 | .089 | 62.5 | N.N.E. | 59 | 1.0 | 10 | 1 P | | | | |
| 18 | 4.0 | .086 | 68.0 | W. | 27 | 0.0 | — | — | | | | |
| 19 | 24.0 | .163 | 83.5 | S.S.W. | 122 | 2.0 | 20 | 12 P | 4 P | 9 P | .16 | T |
| 20 | 22.0 | .147 | 82.5 | N.W. | 270 | 7.5 | 39 | 4 P | 3 A | 4 P | .72 | 3.5 |
| 21 | 18.0 | .158 | 67.0 | N.N.W. | 76 | 12.0 | 49 | 8 P | | | | |
| 22 | 9.0 | .113 | 59.0 | W.N.W. | 425 | 9.0 | 42 | 2 A | 11 P | | T | T |
| 23 | 0.5 | .073 | 63.5 | W. | 185 | 2.0 | 20 | 1 P | 2 P | 6 P | T | T |
| 24 | 5.0 | .078 | 79.0 | S.W. | 79 | 0.5 | 10 | 4 P | 2:30P | 11 P | .04 | .75 |
| 25 | 2.0 | .064 | 77.5 | E. | 114 | 3.5 | 26 | 10 A | | | | |
| 26 | −24.0 | .027 | 52.5 | N.E. | 33 | 0.0 | — | — | | | | |
| 27 | −27.0 | .032 | 52.0 | W. | 10 | 0.0 | — | — | 9 A | 1 P | T | T |
| 28 | 0.0 | .075 | 67.5 | S.S.W. | 1 | 0.0 | — | — | | | | |
| 29 | 21.5 | .132 | 92.0 | N.W. | 47 | 0.5 | 10 | 12 P | 10 A | 10 P | .30 | |
| 30 | 25.0 | .187 | 76.0 | W. | 288 | 10.0 | 45 | 5 P | | | | |
| 31 | 9.0 | .093 | 74.0 | N.N.E. | 118 | 1.5 | 17 | 5 A | | | | |

**Rain or melted snow at base of tower.

*Included in following day.

# Annual Summary for 1914.

### **Pressure.** In inches.

| | |
|---|---|
| Maximum reduced to freezing, | 30.47, Nov. 29th, 10 A. |
| Minimum reduced to freezing, | 28.17, Mar. 1st, 8 P. |
| Maximum reduced to freezing and sea-level, | 30.78, Nov. 29th, 10 A. |
| Minimum reduced to freezing and sea-level, | 28.47, Mar. 1st, 8 P. |
| Mean reduced to freezing and sea-level, | 30.048 |
| Annual range, | 2.31 |

### ***Air Temperature.** In degrees Fahr.

| | |
|---|---|
| Highest, | 96.5, Sept. 22d, 3:30 P. |
| Lowest, | —18.5, Dec. 27th, 6 A. |
| Mean hourly, | 45.8 |
| Mean of means of max. and min., | 46.3 |
| Mean sensible (wet bulb), | 41.4 |
| Annual range, | 115.0 |
| Highest mean daily, | 79.7, Aug. 10 |
| Lowest mean daily, | —7.3, Jan. 13 |
| Mean maximum, | 56.9 |
| Mean minimum, | 35.7 |
| Mean daily range, | 21.2 |
| Greatest daily range, | 50.5, Oct. 3 |
| Least daily range, | 3.0, Mar. 16 |

### **Humidity.**

| | |
|---|---|
| Mean dew point, | 36.6 |
| Mean force of vapor, | .368 |
| Mean relative humidity, | 75.8 |

### **Wind.**

| | |
|---|---|
| Prevailing direction, | West Northwest |

### Summary.

| | |
|---|---|
| North Northeast, | 11 per cent. |
| North, | 11 " " |
| North Northwest, | 10 " " |
| Other directions, | 68 " " |
| Total movement, | 55,455 m |
| Greatest daily movement, | 488 m., Jan. 13 |
| Least daily movement, | 1 m., Dec. 28 |
| Mean daily movement, | 152 m |
| Mean hourly velocity, | 6.3 m |

Maximum pressure per square foot, 30.0 lbs.=77 m. per hour, Mar. 1, 6 P., E.

Maximum velocity for 5 minutes, 45 m. per hour, Mar. 1, 6 P., E.; Apr. 12, 5 P., W.

### **Precipitation.** In inches.

| | |
|---|---|
| Total precipitation, rain or melted snow, | 41.83 |
| Number of days on which .01 or more rain or melted snow fell, | 118 |
| Snow total in inches, | 56.75 |

### **Weather.**

| | |
|---|---|
| Mean cloudiness observed, | 50 per cent. |
| Total cloudiness recorded by Sun Thermometer, | 2077 hrs.=47 per cent. |
| Number of clear days, | 100 |
| Number of fair days, | 139 |
| Number of cloudy days, | 126 |

### **Bright Sunshine.**

Number of hours recorded, 2377 hrs.=53 per cent.

### **Dates of Frosts.**

| | |
|---|---|
| Last, | May 16th |
| First, | Sept. 28th |

### **Dates of Snow.**

| | |
|---|---|
| Last, | April 16th |
| First, | Oct. 27th |
| Total days of sleighing, | 43 |

### **Gales of 50 or More Miles Per Hour.**

Jan. 12th, 63m., W.N.W.; Feb. 14th, 50m., N.N.W.; Mar. 1st, 77m., E.; 19th, 52m., W.N.W.; Apr. 11th, 51m, S.; 12th, 73m, W.; May 23d, 54m, N.W.; 27th, 62m, W.; June 15th, 53m, S.; Aug. 21st, 58m, N.N.W. Nov. 13th, 61m, S.S.W.; 17th, 59m, W.

*Temperature in ground shelter.

J. E. OSTRANDER,
*Meteorologist.*

R. E. McLAIN,
*Observer.*

BULLETIN No. 313. JANUARY, 1915

# Meteorological Observations
AT THE
# MASSACHUSETTS
# AGRICULTURAL EXPERIMENT
# STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.
*Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.*
*Height of Wind Instruments 72 ft.*

## MONTHLY SUMMARY.

### **Pressure.** In inches.

Maximum reduced to freezing, 30 24. 24th, 10A.
Minimum reduced to freezing, 29.00, 19th, 6 A.
Reduced† maximum reading, 30.56, 24th, 10 A.
Reduced† minimum reading, 29.30, 19th, 6 A.

| | |
|---|---|
| Mean semi-daily reduced, | 30.123 |
| Monthly range, | 1.26 |

### ***Air Temperature.** In Degrees Fahr.

| | |
|---|---|
| Highest, | 54.0. 7th, 1:30 P. |
| Lowest, | -4.0, 5th, 8 A |
| Mean hourly, | 26.2 |
| Mean of means of max. and min., | 27.1 |
| Mean sensible (wet bulb), | 24.5 |
| Monthly range, | 58.0 |
| Highest mean daily, | 45.4. 7th |
| Lowest mean daily, | 7.8, 30th |
| Mean maximum, | 35.2 |
| Mean minimum, | 19.0 |
| Mean daily range, | 16.2 |
| Greatest daily range, | 41.0, 5th |
| Least daily range, | 7.0, 24th |

### **Humidity.**

| | |
|---|---|
| Mean dew point, | 19.1 |
| Mean force of vapor, | .147 |
| Mean relative humidity, | 80.8 |

### **Precipitation.** In inches.

| | |
|---|---|
| Total precipitation, | 6.52 |
| Number of days on which .01 inch or more rain fell | 12 |
| Total snow in inches | 11.5 |

### **Wind.**

| | |
|---|---|
| Total movement, | 3986m. |
| Greatest daily movement, | 490m., 13th |
| Least daily movement, | 1m., 4th |
| Mean daily movement, | 129 m |
| Mean hourly velocity, | 5.3 m |

Maximum pressure per square foot, 12.5 lbs.= 50m. per hour, 13th, 7 A., N.

Maximum velocity for 5 minutes, 30m. per hour, 7th, 6A., S.S-W.; 13th, 6A., N.; 19th, 6A., S.S.W.

Prevailing Direction, West Northwest.

### Summary.

| | |
|---|---|
| West | 19 per cent. |
| North | 16 " " |
| North Northwest | 16 " " |
| Northwest | 13 " " |
| South | 10 " " |
| Other directions | 26 " " |

### **Weather.**

| | |
|---|---|
| Mean cloudiness observed, | 51 per cent. |
| Total cloudiness recorded by the Sun Thermometer, | 150 hrs.=51 per cent. |
| Number of clear days, | 11 |
| Number of fair days, | 9 |
| Number of cloudy days, | 11 |

### **Bright Sunshine.**

Number of hours recorded, . . 144 hrs=49%.

**Rain**, 6th, 7th, 12th, 13th, 17th, 18th, 19th, 23d, 25th, 31st.

**Snow**, 2d, 12th, 13th, 17th, 20th, 23d, 24th, 25th, 27th, 28th, 31st.

**Hail**, 17th.

**Days of Sleighing**, 13.

**Gales**, 35 or more miles per hour: 49m, 7th, S.S W; 43m, 12th, N.; 50m, 13th, N.; 43m, 19th, S.S.W.; 36m, 24th, W. N. W.

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* Temperature in ground shelter.

† Reduced to freezing and sea-level.

# DAILY SUMMARY.

| Day. | Barometer Reduced to Sea Level. |  |  | Temperature. Ground Shelter. |  |  |  |  |  |  | No. Hours of Bright Sunshine. |
|---|---|---|---|---|---|---|---|---|---|---|---|
|  | Maximun. | Minimum. | Mean. Semi-daily. | Maximum | Time. | Minimum. | Time. | Mean of Max. and Min. | Mean Hourly Draper. | Mean Sensible Wet Bulb. |  |
| 1 | 30.46 | 30.13 | 30.371 | 30.5 | 3:30 P | 0.0 | 8 A | 15.3 | 12.6 | 7.5 | 8.2 |
| 2 | 30.13 | 29.89 | 30.009 | 28.0 | 3 P | 14.5 | 0 A | 21.3 | 21.7 | 20.3 | 0.0 |
| 3 | 30.39 | 29.94 | 30.289 | 28.5 | 2:30 P | 7.0 | 12 P | 17.7 | 19.3 | 15.3 | 8.0 |
| 4 | 30.44 | 30.35 | 30.425 | 28.5 | 3:30 P | −2.5 | 4:30 A | 13.0 | 8.5 | 3.7 | 7.3 |
| 5 | 30.49 | 30.30 | 30.410 | 37.0 | 3:30 P | −4.0 | 8 A | 16.5 | 15.5 | 12.5 | 8.0 |
| 6 | 30.30 | 29.85 | 30.139 | 41.0 | 4 P | 28.0 | 2 A | 34.5 | 34.0 | 32.5 | 5.6 |
| 7 | 29.86 | 29.49 | 29.646 | 54.0 | 1:30 P | 34.0 | 0:30 A | 44.0 | 45.4 | 42.0 | 8.1 |
| 8 | 30.16 | 29.86 | 30.029 | 37.5 | 12 M | 29.5 | 12 P | 33.5 | 32.8 | 28.5 | 0.8 |
| 9 | 30.27 | 30.17 | 30.233 | 35.0 | 3 P | 22.0 | 12 P | 28.5 | 28.0 | 24.0 | 8.7 |
| 10 | 30.40 | 30.15 | 30.382 | 35.0 | 3 P | 16.5 | 7:30 A | 25.7 | 23.7 | 18.7 | 8.7 |
| 11 | 30.40 | 30.12 | 30.283 | 32.0 | 3:30 P | 11.5 | 7:30 A | 21.7 | 21.2 | 19.5 | 5.5 |
| 12 | 30.12 | 29.48 | 29.785 | 37.0 | 8 P | 26.0 | 0 A | 31.5 | 32.4 | 33.5 | 0.0 |
| 13 | 30.01 | 29.39 | 29.732 | 42.0 | 2:30 P | 28.0 | 12 P | 35.0 | 35.7 | 31.3 | 4.9 |
| 14 | 30.17 | 30.01 | 30.079 | 38.0 | 3 P | 19.5 | 7 A | 28.7 | 28.7 | 25.5 | 8.6 |
| 15 | 30.17 | 29.97 | 30.045 | 41.5 | 3:30 P | 32.0 | 8 A | 36.7 | 34.1 | 32.3 | 3.7 |
| 16 | 30.37 | 30.17 | 30.350 | 44.0 | 3 P | 23.5 | 7:30 A | 33.7 | 32.0 | 26.5 | 7.7 |
| 17 | 30.35 | 29.94 | 30.143 | 38.0 | 9 P | 28.0 | 4:30 A | 33.0 | 34.0 | 33.0 | 0.0 |
| 18 | 29.94 | 29.43 | 29.703 | 45.0 | 11 P | 34.0 | 3 A | 39.5 | 36.2 | 36.0 | 0.0 |
| 19 | 29.44 | 29.30 | 29.414 | 54.0 | 8 A | 34.0 | 12 P | 44.0 | 45.0 | 43.3 | 0.1 |
| 20 | 29.83 | 29.54 | 29.741 | 37.5 | 3 P | 29.5 | 6 A | 33.5 | 31.0 | 27.5 | 3.9 |
| 21 | 30.21 | 29.84 | 30.055 | 33.5 | 1:30 P | 21.0 | 12 P | 27.3 | 26.0 | 21.5 | 7.6 |
| 22 | 30.48 | 30.21 | 30.446 | 24.5 | 3 P | 16.5 | 8 A | 20.5 | 18.6 | 14.7 | 8.3 |
| 23 | 30.44 | 29.98 | 30.135 | 41.5 | 8:30 P | 17.0 | 1 A | 29.3 | 25.3 | 28.7 | 0.6 |
| 24 | 30.56 | 30.22 | 30.496 | 30.0 | 0 A | 23.0 | 7:30 A | 26.5 | 25.3 | 23.5 | 6.0 |
| 25 | 30.40 | 29.77 | 29.916 | 31.0 | 11 P | 23.0 | 6 A | 27.0 | 26.7 | 26.3 | 0.0 |
| 26 | 30.34 | 30.01 | 30.289 | 37.0 | 4:30 P | 20.5 | 11:30 P | 28.7 | 27.7 | 21.0 | 8.5 |
| 27 | 30.35 | 30.16 | 30.219 | 30.5 | 4 P | 21.0 | 0 A | 25.7 | 26.5 | 25.7 | 0.3 |
| 28 | 30.16 | 29.89 | 29.993 | 36.0 | 3:30 P | 27.0 | 12 P | 31.5 | 30.4 | 29.3 | 2.5 |
| 29 | 30.28 | 29.96 | 30.191 | 27.0 | 0 A | 9.0 | 12 P | 18.0 | 14.3 | 9.0 | 4.5 |
| 30 | 30.52 | 30.28 | 30.499 | 20.5 | 3 P | −1.5 | 7:30 A | 9.5 | 7.8 | 1.5 | 7.8 |
| 31 | 30.55 | 30.01 | 30.368 | 17.0 | 12 P | 2.5 | 6:30 A | 9.7 | 10.7 | 10.3 | 0.0 |

# DAILY SUMMARY.

| Day. | Humidity. | | | Wind. | | | | | Precipitation. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Mean Dew Point. | Mean Force vapor. | Mean Relative Humidity. | Prevailing Direction. | Total Movement in Miles. | Maximum Pressure Per Square Ft | Miles per Hour. | Time. | Beginning. | Ending. | Total in Inches. | |
| | | | | | | | | | | | Rain.** | Snow. |
| 1 | 4.0 | .069 | 83.0 | N.N.E. | 5 | 0.0 | — | — | | | | |
| 2 | 17.5 | .116 | 86.0 | S. | 38 | 3.0 | 24 | 11 P | 10 A | 4 P | .12 | 1.25 |
| 3 | 10.0 | .096 | 74.5 | N.W. | 203 | 5.0 | 32 | 11 A | | | | |
| 4 | 1.5 | .056 | 89.5 | N.N.W. | 1 | 0.0 | — | — | | | | |
| 5 | 9 5 | .072 | 84.5 | W. | 87 | 4.0 | 28 | 4 P | | | | |
| 6 | 30.5 | .191 | 91.0 | S. | 142 | 3.0 | 24 | 1 A | 11 P | 12 P | .02 | |
| 7 | 38.5 | .294 | 82.0 | S.S.W. | 249 | 12.0 | 49 | 7 A | 0 A | 6:30A | .95 | |
| 8 | 21.0 | .181 | 63.0 | W. | 270 | 4.5 | 30 | 6 P | | | | |
| 9 | 18.5 | .143 | 74.0 | N.W. | 131 | 1.5 | 17 | 1 A | | | | |
| 10 | 13.5 | .112 | 74.5 | N. | 89 | 1.0 | 14 | 11 A | | | | |
| 11 | 16.0 | .117 | 83.5 | W. | 36 | 1.0 | 14 | 3 P | | | | |
| 12 | 33 0 | .196 | 95.5 | N.N.W. | 145 | 9.0 | 43 | 11 P | 5 A | 12 P | 1.31 | T |
| 13 | 24.5 | .199 | 69.0 | N. | 490 | 12.5 | 50 | 7 A | 0 A | 8 A | .28 | T |
| 14 | 23 0 | .149 | 88.0 | W. | 95 | 1.0 | 14 | 8 P | | | | |
| 15 | 31.0 | .187 | 92.5 | S.E. | 46 | 0.0 | — | — | | | | |
| 16 | 23.5 | .154 | 83.5 | N.N.W. | 73 | 1.0 | 14 | 12 M | | | | |
| 17 | 30 5 | .199 | 87.5 | S.E. | 92 | 2.5 | 22 | 9 A | 10 A | 12 P | .62 | T |
| 18 | 35.0 | .212 | 97.5 | S. | 12 | 0.0 | — | — | 0 A | 12 P | 1.46 | |
| 19 | 40.5 | .317 | 83.5 | W.S.W. | 243 | 9.0 | 43 | 6 A | 0 A | 8 A | .04 | |
| 20 | 22.5 | .163 | 79.5 | W.N.W. | 129 | 2 5 | 22 | 5 A | 10 A | 12 M | T | T |
| 21 | 18.0 | .125 | 81.0 | W.N.W. | 106 | 4.0 | 28 | 5 P | | | | |
| 22 | 6.0 | .097 | 65.0 | N. W. | 194 | 3 5 | 26 | 10 A | | | | |
| 23 | 28.0 | .175 | 98.0 | S.W. | 101 | 5.5 | 33 | 9 P | 0 A | 9 P | .84 | 4.5 |
| 24 | 21.0 | .133 | 84.5 | N.W. | 194 | 6.5 | 36 | 2 A | 11 P | 12 P | T | T |
| 25 | 24.5 | .146 | 94 5 | N.N.W. | 178 | 2.5 | 22 | 11 P | 0 A | 11 A | .35 | 2.0 |
| 26 | 11.0 | .130 | 60.0 | N.N.W. | 123 | 2.0 | 20 | 2 A | | | | |
| 27 | 23.0 | .146 | 86 0 | N. | 97 | 1.0 | 14 | 5 P | 12 M | 1 P | T | T |
| 28 | 27.0 | .167 | 92.0 | N. | 58 | 2 5 | 22 | 9 P | 8 A | 10 P | .11 | 1.25 |
| 29 | −4.5 | .076 | 50.0 | W. | 233 | 5.5 | 33 | 3 A | | | | |
| 30 | −13.0 | .055 | 44.5 | N. | 101 | 1.0 | 14 | 2 P | | | | |
| 31 | 8.5 | .075 | 88.0 | W. | 25 | 0.0 | — | — | 11 A | 12 P | .42 | 2.5 |

**Rain or melted snow at base of tower. *Included in following day.

## REMARKS

The most noticeable feature of the weather for January was the unusually large precipitation, the greater part of which occurred as rain. The total snowfall was nearly one foot and nearly all of it occurred during the latter part of the month. The total precipitation was the largest January record since 1898.

The first five days and the last five days of the month were periods of low temperature, while the intervening period was generally warmer than the average for the month. The mean temperature for the month was two degrees higher than that of the preceding month, although the normal for January is more than three degrees lower than for December.

The records of the several weather elements show the following features of interest: The mean barometer was considerably higher than the normal while the range was comparatively small. The maximum pressure was below 30 inches on only four days, although the maximum for the month was much lower than the normal. The range of pressure was about eight-tenths of the usual amount and changes in pressure were generally slow. The total wind movement was about one thousand miles less than the normal and very few days had a large wind movement.

The mean temperature was one and one-half degrees higher than the normal, and the maximum and minimum were both about three degrees above their normals. The minimum temperature fell below zero on three days, but the total period for the month showing a temperature below zero was only nine hours.

The mean dew point and relative humidity were both comparatively high.

The total precipitation was about three inches more than the normal and was well distributed throughout the month. Several of the heavy storms were both snow and rain.

The amount of sunshine recorded was above the average.

J. E. OSTRANDER, Meteorologist.

R. E. McLAIN, Observer.

BULLETIN No. 314. FEBRUARY, 1915

# Meteorological Observations
AT THE
# MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.
*Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.*
*Height of Wind Instruments 72 ft.*

## MONTHLY SUMMARY.

### **Pressure.** In inches.

| | |
|---|---|
| Maximum reduced to freezing, | 30 26, 19th, 8 A. |
| Minimum reduced to freezing, | 28.96, 25th, 2 P. |
| Reduced† maximum reading, | 30.58, 19th, 8 A. |
| Reduced† minimum reading, | 29.27, 25th, 2 P. |
| Mean semi-daily reduced, | 30.120 |
| Monthly range, | 1.31 |

### ***Air Temperature.** In Degrees Fahr.

| | |
|---|---|
| Highest, | 51.0, 24th, 11 P. |
| Lowest, | 2.0, 5th, 7:30 A. |
| Mean hourly, | 28.0 |
| Mean of means of max. and min., | 28.9 |
| Mean sensible (wet bulb), | 25 3 |
| Monthly range, | 49.0 |
| Highest mean daily, | 42.3, 25th |
| Lowest mean daily, | 10.0, 2d |
| Mean maximum, | 37.4 |
| Mean minimum, | 20.3 |
| Mean daily range, | 17.1 |
| Greatest daily range, | 34.5, 11th |
| Least daily range, | 7.0, 2d, 16th |

### **Humidity.**

| | |
|---|---|
| Mean dew point, | 21.2 |
| Mean force of vapor, | .159 |
| Mean relative humidity, | 78.9 |

### **Precipitation.** In inches.

| | |
|---|---|
| Total precipitation, | 7.02 |
| Number of days on which .01 inch or more rain fell | 12 |
| Total snow in inches | 6.5 |

* Temperature in ground shelter.

† Reduced to freezing and sea-level.

### **Wind.**

| | |
|---|---|
| Total movement, | 4341m. |
| Greatest daily movement, | 442m., 26th |
| Least daily movement, | 5m., 22d |
| Mean daily movement, | 155 m |
| Mean hourly velocity, | 6.5 m |

Maximum pressure per square foot, 9.0 lbs.= 42m. per hour, 18th, 3 P., N.

Maximum velocity for 5 minutes, 27m. per hour, 27th, 3P., W.N.W.

Prevailing Direction, Northwest.

### Summary.

| | |
|---|---|
| North | 18 per cent. |
| South Southwest | 14 " " |
| North Northwest | 14 " " |
| Northwest | 11 " " |
| West | 11 " " |
| Other directions | 32 " " |

### **Weather.**

| | |
|---|---|
| Mean cloudiness observed, | 51 per cent. |
| Total cloudiness recorded by the Sun Thermometer, | 181 hrs.=61 per cent. |
| Number of clear days, | 9 |
| Number of fair days, | 4 |
| Number of cloudy days, | 15 |

### **Bright Sunshine.**

Number of hours recorded, . . 115 hrs=39%.

**Rain**, 1st, 5th, 6th, 7th, 15th, 16th, 23d, 24th, 25th.

**Snow**, 1st, 2d, 3d, 5th,7th, 8th.

**Hail**, 1st, 2d.

**Days of Sleighing**, 19.

**Gales**, 35 or more miles per hour: 35m, 11th, S.S.E.; 42m, 18th, N.; 39m, 26th, W.; 41m, 27th, W. N. W.

# DAILY SUMMARY.

| Day. | Barometer Reduced to Sea Level. |  |  | Temperature. Ground Shelter. |  |  |  |  |  |  | No. Hours of Bright Sunshine. |
|---|---|---|---|---|---|---|---|---|---|---|---|
|  | Maximun. | Minimum. | Mean. Semi-daily. | Maximum | Time. | Minimum. | Time. | Mean of Max. and Min. | Mean Hourly Draper. | Mean Sensible Wet Bulb. |  |
| 1 | 30.29 | 29.88 | 30.065 | 32.5 | 2:30 P | 15.0 | 12 P | 23.7 | 23.1 | 21.7 | 0.0 |
| 2 | 30.33 | 29.96 | 30.141 | 15.0 | 0 A | 8.0 | 11 A | 11.5 | 10.0 | 9.3 | 0.0 |
| 3 | 30.15 | 29.90 | 30.006 | 20.0 | 2 P | 11.0 | 0 A | 15.5 | 15.7 | 15.3 | 0.0 |
| 4 | 30.33 | 30.15 | 30.289 | 34.5 | 4 P | 12.0 | 12 P | 23.3 | 20.2 | 15.7 | 8.4 |
| 5 | 30.33 | 30.03 | 30.225 | 30.5 | 12 P | 2.0 | 7:30 A | 16.3 | 18.2 | 17.0 | 0.7 |
| 6 | 30.03 | 29.76 | 29.791 | 46.5 | 3:30 P | 30.5 | 0 A | 38.5 | 38.3 | 38.7 | 0.3 |
| 7 | 29.88 | 29.71 | 29.782 | 42.5 | 3:30 P | 29.0 | 7:30 A | 35.7 | 34.5 | 31.0 | 2.2 |
| 8 | 29.96 | 29.71 | 29.843 | 36.0 | 1:30 P | 23.5 | 11:30 P | 29.7 | 30.0 | 26.3 | 3.0 |
| 9 | 30.30 | 29.96 | 30.150 | 30.0 | 2 P | 15.5 | 12 P | 22.7 | 22.6 | 18.0 | 6.3 |
| 10 | 30.54 | 30.30 | 30.489 | 28.0 | 5 P | 6.5 | 7:30 A | 17.3 | 14.5 | 12.3 | 8.5 |
| 11 | 30.54 | 30.18 | 30.398 | 38.5 | 2:30 P | 4.0 | 7:30 A | 21.3 | 23.2 | 19.0 | 4.4 |
| 12 | 30.28 | 29.98 | 30.125 | 44.5 | 4:30 P | 30.0 | 12 P | 37.3 | 37.8 | 32.0 | 0.3 |
| 13 | 30.45 | 30.28 | 30.423 | 41.0 | 2:30 P | 20.0 | 7:30 A | 30.5 | 27.6 | 24.3 | 8.9 |
| 14 | 29.43 | 30.31 | 30.377 | 37.5 | 9 P | 20.0 | 3 A | 28.7 | 29.0 | 29.3 | 0.0 |
| 15 | 30.31 | 30.10 | 30.159 | 42.5 | 6:30 P | 33.0 | 4:30 A | 37.7 | 35.7 | 36.0 | 0.0 |
| 16 | 30.20 | 30.11 | 30.181 | 38.5 | 3 P | 31.5 | 12 P | 35.0 | 35.5 | 31.5 | 0.0 |
| 17 | 30.37 | 30.09 | 30.293 | 35.0 | 4 P | 22.0 | 12 P | 28.5 | 29.8 | 26.5 | 8.7 |
| 18 | 30.49 | 30.37 | 30.453 | 32.0 | 3 P | 16.5 | 6:30 A | 24.3 | 23.7 | 20.5 | 9.1 |
| 19 | 30.58 | 30.44 | 30.523 | 42.0 | 3:30 P | 19.0 | 6:30 A | 30.5 | 28.2 | 23.0 | 9.3 |
| 20 | 30.44 | 30.34 | 30.398 | 49.0 | 4:30 P | 24.5 | 6 A | 36.7 | 34.6 | 29.0 | 9.2 |
| 21 | 30.43 | 30.33 | 30.378 | 46.0 | 3:30 P | 22.0 | 7:30 A | 34.0 | 32.6 | 27.5 | 9.1 |
| 22 | 30.37 | 30.22 | 30.303 | 47.0 | 4:30 P | 20.0 | 7:30 A | 33.5 | 31.2 | 28.5 | 7.8 |
| 23 | 30.22 | 30.13 | 30.182 | 45.0 | 9 P | 35.0 | 7 A | 40.0 | 38.7 | 36.7 | 1.5 |
| 24 | 30.13 | 29.66 | 29.861 | 51.0 | 11 P | 35.0 | 4 A | 43.0 | 40.8 | 41.5 | 0.0 |
| 25 | 29.66 | 29.27 | 29.369 | 50.0 | 3:30 A | 37.0 | 12 P | 43.5 | 42.3 | 41.0 | 0.0 |
| 26 | 29.72 | 29.38 | 29.614 | 37.0 | 0 A | 15.5 | 12 P | 26.3 | 24.7 | 21.7 | 0.0 |
| 27 | 29.83 | 29.72 | 29.756 | 26.0 | 3 P | 14.0 | 5:30 A | 20.0 | 19.0 | 16.5 | 8.5 |
| 28 | 29.82 | 29.75 | 29.785 | 29.5 | 3:30 P | 17.5 | 3 A | 23.5 | 22.3 | 20.0 | 8.9 |

# DAILY SUMMARY.

| Day. | Humidity. | | | Wind. | | | | | Precipitation. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Mean Dew Point. | Mean Force vapor. | Mean Relative Humidity. | Prevailing Direction. | Total Movement in Miles. | Maximum Pressure Per Square Ft | Miles per Hour. | Time. | Beginning. | Ending. | Total in Inches. | |
| | | | | | | | | | | | Rain.** | Snow. |
| 1 | 18.5 | .125 | 83.5 | N.N.W. | 111 | 4.5 | 30 | 7 P | 0 A | 12 P | .86 | 0.5 |
| 2 | 7.0 | .070 | 87.5 | N.N.E. | 306 | 3.0 | 24 | 6 A | 0 A | 12 P | .34 | 3.0 |
| 3 | 13.0 | .092 | 87.0 | N. | 171 | 3.0 | 24 | 11 P | 0 A | 12 P | 1.05 | 2.25 |
| 4 | 13.5 | .095 | 87.0 | N.N.W. | 127 | 1.0 | 14 | 2 A | | | | |
| 5 | 17.0 | .110 | 100.0 | S.S.W. | 41 | 2.0 | 20 | 2 P | 4 P | 12 P | .19 | T |
| 6 | 36.0 | .253 | 74.5 | S. | 64 | 1.0 | 14 | 8 P | 0 A | 1 P | .31 | |
| 7 | 28.5 | .183 | 88.0 | S.S.W. | 34 | 0.0 | — | — | 7 P | 12 P | .15 | 0.5 |
| 8 | 22.5 | .152 | 83.0 | N.W. | 113 | 1.0 | 14 | 11 A | 0 A | 8 A | .05 | 0.25 |
| 9 | 14.0 | .107 | 77.5 | N.W. | 146 | 4.5 | 30 | 3 P | | | | |
| 10 | 9.0 | .083 | 81.5 | N. | 120 | 3.5 | 26 | 4 A | | | | |
| 11 | 13.5 | .131 | 73.0 | S.S.E. | 166 | 6.0 | 35 | 9 P | | | | |
| 12 | 28.0 | .207 | 75.0 | W. | 219 | 4.0 | 28 | 7 P | | | | |
| 13 | 20.5 | .142 | 79.5 | N. | 130 | 0.5 | 10 | 8 P | | | | |
| 14 | 26.5 | .175 | 84.5 | W. | 20 | 0.5 | 10 | 3 P | | | | |
| 15 | 35.0 | .213 | 97.5 | S. | 24 | 0.0 | — | — | 1 A | 12 P | .91 | |
| 16 | 25.0 | .206 | 65.5 | N.W. | 147 | 2.0 | 20 | 2 P | 0 A | 5 A | .07 | |
| 17 | 22.0 | .159 | 75.0 | N.N.W. | 209 | 4.0 | 28 | 1 P | | | | |
| 18 | 14.0 | .125 | 68.5 | N. | 290 | 9.0 | 42 | 3 P | | | | |
| 19 | 14.0 | .149 | 59.5 | N.N.W. | 230 | 2.0 | 20 | 5 A | | | | |
| 20 | 19.5 | .191 | 63.5 | N. | 211 | 3.0 | 24 | 9 A | | | | |
| 21 | 21.5 | .169 | 69.0 | N.N.E. | 42 | 0.0 | — | — | | | | |
| 22 | 24.5 | .179 | 77.5 | N.E. | 5 | 0.0 | — | — | | | | |
| 23 | 33.0 | .239 | 81.5 | S.S.W. | 36 | 0.0 | — | — | 10 P | 12 P | .02 | |
| 24 | 39.5 | .289 | 87.0 | S.S.W. | 34 | 2.0 | 22 | 7 P | 0 A | 12 P | .88 | |
| 25 | 39.5 | .273 | 89.0 | W.S.W | 143 | 4.5 | 30 | 12 P | 0 A | 10 P | 2.19 | |
| 26 | 16.0 | .121 | 78.0 | W. | 442 | 7.5 | 39 | 6 A | | | | |
| 27 | 8.5 | .105 | 67.0 | W.N.W. | 424 | 8.5 | 41 | 3 P | | | | |
| 28 | 13.5 | .120 | 70.5 | W.N.W. | 336 | 5.0 | 32 | 3 P | | | | |

**Rain or melted snow at base of tower. *Included in following day.

## REMARKS

The most noticeable features of the weather for the month were the large precipitation and absence of extreme cold. No zero weather occurred, and only three dates showed a minimum temperature lower than ten degrees above zero. The large precipitation record was accompanied by a correspondingly small sunshine record.

The records of the several weather elements show the following as the more important features. The mean barometer was considerably higher than the normal and the range considerably less than usual at this time of year. Owing to the comparatively steady barometer the total wind movement was rather small, and the few gales recorded were only of moderate intensity. The maximum pressure was nearly normal.

The mean temperature was about four degrees higher than the February normal, making the record the highest since 1909. The maximum temperature was nearly normal, while the minimum was more than ten degrees higher than usual, giving a comparatively small range. The first half the month was considerably colder than the last half.

The mean dewpoint was about four degrees higher than the normal and the relative humidity a little above the average.

The total precipitation was more than twice the normal and the largest February record since 1900. Several heavy storms occurred, but the one of the 24th—25th was much the largest—more than three inches of rain being registered. The snowfall was not large, and practically all of it occurred during the first week of the month.

The total wind movement was about ten per cent less than usual.

J. E. OSTRANDER, Meteorologist.

R. E. McLAIN, Observer.

**BULLETIN No. 315. MARCH, 1915**

# Meteorological Observations
AT THE
# MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.
*Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.*
*Height of Wind Instruments 72 ft.*

## MONTHLY SUMMARY.

### Pressure. In inches.

| | | | |
|---|---|---|---|
| Maximum reduced to freezing, | 30.02, | 5th, | 8 A. |
| Minimum reduced to freezing, | 29.21, | 21st, | 2 P. |
| Reduced† maximum reading, | 30.37, | 5th, | 8 A. |
| Reduced† minimum reading, | 29.52, | 21st, | 2 P. |
| Mean semi-daily reduced, | 29.832 | | |
| Monthly range, | 0.85 | | |

### *Air Temperature. In Degrees Fahr.

| | | | |
|---|---|---|---|
| Highest, | 57.5, | 25th, | 4 P. |
| Lowest, | 13.0, | 3d, | 12 P. |
| Mean hourly, | 32.0 | | |
| Mean of means of max. and min., | 32.8 | | |
| Mean sensible (wet bulb), | 27.3 | | |
| Monthly range, | 44.5 | | |
| Highest mean daily, | 43.8, | 25th | |
| Lowest mean daily, | 19.5, | 3d | |
| Mean maximum, | 43.0 | | |
| Mean minimum, | 22.6 | | |
| Mean daily range, | 20.3 | | |
| Greatest daily range, | 31.0, | 4th | |
| Least daily range, | 12.0, | 7th | |

### Humidity.

| | |
|---|---|
| Mean dew point, | 20.0 |
| Mean force of vapor, | .175 |
| Mean relative humidity, | 65.4 |

### Precipitation. In inches.

| | |
|---|---|
| Total precipitation, | 0.12 |
| Number of days on which .01 inch or more rain fell | 3 |
| Total snow in inches | 0.5 |

### Wind.

| | |
|---|---|
| Total movement, | 6864m. |
| Greatest daily movement, | 555m., 3d |
| Least daily movement, | 63m., 23d |
| Mean daily movement, | 221m. |
| Mean hourly velocity, | 9.2 m. |

Maximum pressure per square foot, 16.0 lbs.= 57m. per hour, 26th, 12M., W.

Maximum velocity for 5 minutes, 36m. per hour, 26th, 12M., W.

Prevailing Direction, Northwest.

### Summary.

| | |
|---|---|
| Northwest | 32 per cent. |
| North Northwest | 23 " " |
| West Northwest | 19 " " |
| West | 19 " " |
| Other directions | 7 " " |

### Weather.

| | |
|---|---|
| Mean cloudiness observed, | 27 per cent. |
| Total cloudiness recorded by the Sun Thermometer, | 81 hrs.=22 per cent. |
| Number of clear days, | 17 |
| Number of fair days, | 13 |
| Number of cloudy days, | 1 |

### Bright Sunshine.

Number of hours recorded, . . 290 hrs=78%.

**Rain**, 21st, 22d, 25th.

**Snow**, 2d, 22d, 23d, 26th, 29th, 30th.

**Gales**, 35 or more miles per hour: 35m., 1st, W.N.W.; 40m., 2d, W.N.W.; 40m., 3d, W.N.W.; 37m., 4th, N.N.W.; 36m., 10th, W.N.W.; 35m., 11th, N.W.; 39m., 14th, N.N.W.; 39m., 15th, W.N.W.; 57m., 26th, W.; 44m., 27th, N.W.; 36m., 29th, W.N.W.; 41m., 30th, W.N.W.

* Temperature in ground shelter.
† Reduced to freezing and sea-level.

# DAILY SUMMARY.

| Day. | Barometer Reduced to Sea Level. | | | Temperature. Ground Shelter. | | | | | | | No. Hours of Bright Sunshine |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Maximun. | Minimum. | Mean. Semi-daily. | Maximum | Time. | Minimum. | Time. | Mean of Max. and Min. | Mean Hourly Draper. | Mean Sensible Wet Bulb. | |
| 1 | 29.81 | 29.71 | 29.757 | 33.0 | 4:30 P | 17.0 | 2 A | 25.0 | 24.5 | 20.5 | 9.6 |
| 2 | 29.77 | 29.67 | 29.723 | 38.5 | 3 P | 24.0 | 3:30 A | 31.3 | 30.9 | 29.7 | 4.6 |
| 3 | 30.13 | 29.75 | 29.965 | 26.0 | 0 A | 13.0 | 12 P | 19.5 | 19.5 | 16.3 | 9.4 |
| 4 | 30.32 | 30.13 | 30.295 | 44.0 | 3:30 P | 13.0 | 0 A | 28.5 | 27.5 | 23.3 | 10.6 |
| 5 | 30.37 | 30.18 | 30.287 | 44.0 | 4 P | 20.5 | 7 A | 32.3 | 31.5 | 27.0 | 9.7 |
| 6 | 30.18 | 29.84 | 30.012 | 42.5 | 3 P | 26.5 | 6 A | 34.5 | 33.8 | 30.7 | 7.0 |
| 7 | 29.84 | 29.66 | 29.739 | 44.0 | 2:30 P | 32.0 | 6 A | 38.0 | 36.1 | 29.7 | 6.9 |
| 8 | 29.85 | 29.69 | 29.789 | 42.0 | 4 P | 25.0 | 12 P | 33.5 | 32.7 | 26.5 | 9.1 |
| 9 | 29.87 | 29.76 | 29.849 | 43.0 | 3:30 P | 20.0 | 7 A | 31.5 | 30.6 | 25.0 | 10.6 |
| 10 | 29.84 | 29.61 | 29.708 | 43.0 | 3 P | 25.0 | 6:30 A | 34.0 | 32.7 | 27.7 | 9.3 |
| 11 | 29.79 | 29.67 | 29.721 | 43.0 | 3 P | 27.5 | 6 A | 35.3 | 34.3 | 29.7 | 10.2 |
| 12 | 30.08 | 29.79 | 29.972 | 39.0 | 4 P | 22.5 | 7 A | 30.7 | 29.3 | 22.3 | 11.2 |
| 13 | 30.10 | 29.90 | 30.010 | 48.0 | 4 P | 18.5 | 7 A | 33.3 | 32.7 | 27.7 | 11.4 |
| 14 | 29.95 | 29.82 | 29.898 | 44.5 | 3:30 P | 22.5 | 7 A | 33.5 | 32.9 | 27.0 | 11.4 |
| 15 | 29.88 | 29.62 | 29.717 | 42.5 | 3:30 P | 20.5 | 3:30 A | 31.5 | 30.8 | 26.3 | 11.5 |
| 16 | 29.70 | 29.59 | 29.657 | 45.0 | 3 P | 20.0 | 7 A | 32.5 | 32.0 | 25.7 | 11.5 |
| 17 | 29.71 | 29.58 | 29.677 | 40.0 | 2 P | 22.0 | 7 A | 31.0 | 29.3 | 26.3 | 7.4 |
| 18 | 29.84 | 29.71 | 29.803 | 38.0 | 4 P | 21.0 | 6 A | 29.5 | 28.1 | 23.5 | 10.4 |
| 19 | 29.83 | 29.70 | 29.779 | 47.0 | 3:30 P | 19.5 | 6:30 A | 33.3 | 32.5 | 28.0 | 11.8 |
| 20 | 29.72 | 29.59 | 29.671 | 46.5 | 3 P | 22.5 | 6:30 A | 34.5 | 34.2 | 27.5 | 11.8 |
| 21 | 29.62 | 29.52 | 29.561 | 42.5 | 3:30 P | 27.5 | 3 A | 35.0 | 35.1 | 32.5 | 3.6 |
| 22 | 29.65 | 29.58 | 29.645 | 46.0 | 12:30 P | 28.5 | 7 A | 37.3 | 37.5 | 34.5 | 5.8 |
| 23 | 29.72 | 29.60 | 29.668 | 51.5 | 5 P | 32.0 | 7:30 A | 41.7 | 38.3 | 33.3 | 8.0 |
| 24 | 29.82 | 29.69 | 29.779 | 54.5 | 2:30 P | 28.0 | 6:30 A | 41.3 | 41.0 | 33.3 | 11.6 |
| 25 | 29.88 | 29.75 | 29.845 | 57.5 | 4 P | 31.0 | 5 A | 44.3 | 43.8 | 38.3 | 9.6 |
| 26 | 30.07 | 29.75 | 29.933 | 43.0 | 0 A | 19.0 | 12 P | 31.0 | 31.1 | 24.5 | 7.7 |
| 27 | 30.07 | 29.95 | 30.039 | 36.0 | 4 P | 16.5 | 5 A | 26.3 | 25.4 | 24.0 | 11.8 |
| 28 | 30.00 | 29.79 | 29.897 | 47.5 | 6 P | 21.5 | 5 A | 34.5 | 33.7 | 31.0 | 9.7 |
| 29 | 29.86 | 29.71 | 29.779 | 36.5 | 3 P | 23.5 | 12 P | 30.0 | 29.6 | 25.3 | 6.3 |
| 30 | 29.87 | 29.94 | 29.809 | 32.5 | 3 P | 18.0 | 6 A | 25.3 | 25.6 | 21.5 | 8.8 |
| 31 | 29.85 | 29.71 | 29.798 | 50.5 | 4 P | 23.0 | 4 A | 36.7 | 35.6 | 28.7 | 12.0 |

# DAILY SUMMARY.

| Day. | Humidity. |  |  | Wind. |  |  |  |  | Precipitation. |  |  |  |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
|  |  |  |  |  |  |  |  |  |  |  | Total in Inches. |  |
|  | Mean Dew Point. | Mean Force vapor. | Mean Relative Humidity. | Prevailing Direction. | Total Movement in Miles. | Maximum Pressure Per Square Ft | Miles per Hour. | Time. | Beginning. | Ending. | Rain.** | Snow. |
| 1 | 9.0 | .133 | 50.5 | W.N.W. | 222 | 6.0 | 35 | 1 P |  |  |  |  |
| 2 | 25.5 | .181 | 77.5 | W. | 254 | 8.0 | 40 | 10 P | 10 A | 7 P | T | T |
| 3 | 11.0 | .101 | 73.0 | W.N.W. | 555 | 8.0 | 40 | 1 A |  |  |  |  |
| 4 | 14.5 | .147 | 60.0 | N.N.W. | 285 | 7.0 | 37 | 10 A |  |  |  |  |
| 5 | 21.5 | .166 | 70.5 | N.W. | 108 | 1.0 | 14 | 12 M |  |  |  |  |
| 6 | 26.0 | .188 | 78.5 | N. | 79 | 1.0 | 14 | 2 P |  |  |  |  |
| 7 | 20.5 | .197 | 58.0 | N.N.W. | 112 | 1.0 | 14 | 2 P |  |  |  |  |
| 8 | 16.5 | .169 | 62.0 | N.N.W. | 263 | 5.5 | 33 | 12 P |  |  |  |  |
| 9 | 14.0 | .161 | 54.5 | N.N.W. | 295 | 5.0 | 32 | 6 P |  |  |  |  |
| 10 | 18.0 | .181 | 56.0 | N.W. | 257 | 6.5 | 36 | 3 P |  |  |  |  |
| 11 | 25.5 | .187 | 73.5 | N.W. | 280 | 6.0 | 35 | 12 M |  |  |  |  |
| 12 | 10.5 | .145 | 51.5 | N.W. | 271 | 5.0 | 32 | 9 A |  |  |  |  |
| 13 | 18.0 | .181 | 56.0 | N.W. | 160 | 3.0 | 24 | 3 P |  |  |  |  |
| 14 | 16.0 | .179 | 52.5 | N.N.W. | 199 | 7.5 | 39 | 12 M |  |  |  |  |
| 15 | 15.5 | .173 | 55.0 | N.W. | 229 | 7.5 | 39 | 1 P |  |  |  |  |
| 16 | 14.0 | .170 | 49.0 | N.W- | 144 | 4.0 | 28 | 3 P |  |  |  |  |
| 17 | 22.5 | .155 | 78.0 | N.N.W. | 209 | 3.0 | 24 | 9 A |  |  |  |  |
| 18 | 17.0 | .143 | 68.0 | N.W. | 251 | 3.5 | 26 | 10 A |  |  |  |  |
| 19 | 21.5 | .175 | 68.5 | W.N.W. | 110 | 3.0 | 24 | 1 P |  |  |  |  |
| 20 | 17.0 | .183 | 54.0 | W. | 157 | 3.0 | 24 | 10 A |  |  |  |  |
| 21 | 26.5 | .211 | 69.0 | W. | 201 | 4.5 | 30 | 11 A | 4 P |  | T |  |
| 22 | 32.5 | .210 | 86.5 | W.N.W. | 65 | 0.0 | — | — | 5 P | 12 P | .05 | 0.25 |
| 23 | 28.5 | .216 | 74.5 | W. | 63 | 2.0 | 20 | 4 P | 0 A | 9 A | .03 | T |
| 24 | 24.0 | .233 | 56.0 | W. | 115 | 2.0 | 20 | 3 P |  |  |  |  |
| 25 | 31.0 | .277 | 64.0 | W. S.W. | 163 | 5.0 | 32 | 7 P | 8 P |  | T |  |
| 26 | 16.5 | .157 | 61.5 | W. | 489 | 16.0 | 57 | 12 M | 10 A |  | T | T |
| 27 | 20.5 | .145 | 81.0 | N.W. | 489 | 9.5 | 44 | 1 P |  |  |  |  |
| 28 | 28.0 | .187 | 83.0 | W.N.W. | 131 | 3.0 | 24 | 12 P |  |  |  |  |
| 29 | 20.0 | .150 | 73.0 | N.N.W. | 212 | 6.5 | 36 | 12 M | 8 A |  | T | T |
| 30 | 16.5 | .129 | 74.5 | W.N.W. | 271 | 8.5 | 41 | 2 P | 1 A | 6 A | .04 | ¼ |
| 31 | 20.5 | .190 | 59.0 | N.W. | 225 | 3.0 | 24 | 6 A |  |  |  |  |

**Rain or melted snow at base of tower. *Included in following day.

# REMARKS

The weather during March was abnormal in many respects, but the most noticeable feature of all was the small precipitation record. During the first three weeks of the month only a trace was recorded. The last third of the month had two light snowfalls totaling about one-half inch of snow and melting to about one-eighth of an inch of water—a negligible amount. On examining the precipitation records for this locality, dating from 1836, it is found that it is the smallest monthly record. The next smallest was the record of .27 inches, made in August, 1876.

As might be expected from the general absence of precipitation the amount of sunshine was exceptionally large, the number of hours being greater than for any preceding March since this station was established. More than one-half the days were clear and only a single cloudy day was observed.

Another unusual feature was the persistency of the wind from the northwest quadrant. On but a single date was the prevailing direction outside that quadrant.

Although the sunshine was large, as noted above, the mean temperature for the month was more than two degrees below the normal. The maximum temperature was about five degrees lower than usual and the minimum more than six degrees higher than its normal, giving a comparatively small range for the month.

The mean relative humidity was about nine per cent lower than the normal and the mean dew point about six degrees below the March average.

The mean barometer was exceptionally low and the range the smallest for March since this station was established. The comparatively steady pressure is of especial interest when we take into account the fact that the total wind movement was more than twenty per cent above the normal.

J. E. OSTRANDER, Meteorologist.

R. E. McLAIN, Observer.

BULLETIN No. 316. APRIL, 1915

# Meteorological Observations
AT THE
# MASSACHUSETTS
# AGRICULTURAL EXPERIMENT
# STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.
*Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.*
*Height of Wind Instruments 72 ft.*

## MONTHLY SUMMARY.

### **Pressure.** In inches.

| | |
|---|---|
| Maximum reduced to freezing | 30.21, 22d, 8 A. |
| Minimum reduced to freezing | 29.24, 29th, 5 P. |
| Reduced† maximum reading | 30.51, 22d, 8 A |
| Reduced† minimum reading | 29.52, 29th, 5 P. |
| Mean semi-daily reduced | 30.034 |
| Monthly range | 0.99 |

### ***Air Temperature.** In Degrees Fahr.

| | |
|---|---|
| Highest | 88.0, 25th, 3P.; 27th, 4:30 P. |
| Lowest | 21.5, 5th, 6A. |
| Mean hourly | 49.9 |
| Mean of means of max. and min. | 51.1 |
| Mean sensible (wet bulb) | 43.4 |
| Monthly range | 66.5 |
| Highest mean daily | 70.9, 27th |
| Lowest mean daily | 30.1, 3d |
| Mean maximum | 63.0 |
| Mean minimum | 39.2 |
| Mean daily range | 23.8 |
| Greatest daily range | 42.5, 25th |
| Least daily range | 8.0, 3d |

### **Humidity.**

| | |
|---|---|
| Mean dew point | 37.5 |
| Mean force of vapor | .362 |
| Mean relative humidity | 67.8 |

### **Precipitation.** In inches.

| | |
|---|---|
| Total precipitation | 3.99 |
| Number of days on which .01 inch or more rain fell | 7 |
| Total snow in inches | 9.5 |

### **Wind.**

| | |
|---|---|
| Total movement | 5195m. |
| Greatest daily movement | 461m., 4th |
| Least daily movement | 53m., 6th |
| Mean daily movement | 173m. |
| Mean hourly velocity | 7.2 m. |

Maximum pressure per square foot, 12.5 lbs.= 50m. per hour, 3d, 10P., N.

Maximum velocity for 5 minutes, 33m. per hour, 12th, 10A., S.S.W.

Prevailing Direction, Northwest.

### Summary.

| | |
|---|---|
| Northwest | 13 per cent. |
| North Northwest | 17 " " |
| South Southwest | 17 " " |
| North Northeast | 17 " " |
| Other directions | 36 " " |

### **Weather.**

Mean cloudiness observed, . . . . 46 per cent.

Total cloudiness recorded by the Sun Thermometer, . . . . . 179 hrs.=44 per cent.

| | |
|---|---|
| Number of clear days | 4 |
| Number of fair days | 18 |
| Number of cloudy days | 8 |

### **Bright Sunshine.**

Number of hours recorded, . . 223 hrs=56%.

**Rain**, 6th, 10th, 11th, 12th, 22d, 23d, 27th, 28th, 29th, 30th.

**Snow**, 2d, 3d.

**Thunder and Lightning**, 10th, 11th, 25th, 27th, 29th, 30th.

**Frosts**, 3d, 5th, 22d.

**Gales**, 35 or more miles per hour: 50m., 3d, N.; 40m., 4th, N.; 44m, 12th, S.S.W.; 44m., 18th, N.; 36m., 20th, N.; 36m., 21st, N.N.E.; 40m., 22d, E.N.E.

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*Temperature in ground shelter.

† Reduced to freezing and sea-level.

# DAILY SUMMARY.

| Day. | Barometer Reduced to Sea Level. | | | Temperature. Ground Shelter. | | | | | | | No. Hours of Bright Sunshine. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Maximun. | Minimum. | Mean. Semi-daily. | Maximum. | Time. | Minimum. | Time. | Mean of Max. and Min. | Mean Hourly Draper. | Mean Sensible Wet Bulb. | |
| 1 | 30.03 | 29.83 | 29.948 | 49.0 | 2 P | 35.0 | 0 A | 42.0 | 40.3 | 34.3 | 5.3 |
| 2 | 30.21 | 30.03 | 30.131 | 49.0 | 5 P | 30.0 | 6 A | 39.5 | 38.5 | 32.5 | 5.0 |
| 3 | 30.20 | 29.57 | 29.891 | 35.0 | 12 M | 27.0 | 6 P | 31.0 | 30.1 | 28.3 | 0.0 |
| 4 | 30.11 | 29.54 | 29.831 | 48.5 | 4:30 P | 28.5 | 0 A | 38.5 | 37.3 | 32.5 | 9.0 |
| 5 | 30.25 | 30.11 | 30.232 | 50.0 | 4 P | 21.5 | 6 A | 35.7 | 37.3 | 31.7 | 8.0 |
| 6 | 30.25 | 29.99 | 30.081 | 45.5 | 4:30 P | 36.0 | 7 A | 40.7 | 38.6 | 37.5 | 1.0 |
| 7 | 30.15 | 30.04 | 30.069 | 52.0 | 4:30 P | 37.0 | 0 A | 44.5 | 43.3 | 39.0 | 2.3 |
| 8 | 30.24 | 30.04 | 30.133 | 67.0 | 4 P | 32.5 | 5 A | 49.7 | 49.5 | 41.0 | 11.7 |
| 9 | 30.29 | 30.13 | 30.237 | 70.0 | 3:30 P | 32.5 | 6 A | 51.3 | 51.0 | 42.3 | 9.5 |
| 10 | 30.15 | 29.89 | 29.980 | 66.0 | 5 P | 46.5 | 6 A | 56.3 | 54.3 | 51.5 | 4.7 |
| 11 | 29.95 | 29.77 | 29.865 | 63.0 | 2 P | 51.0 | 6 A | 57.0 | 54.5 | 52.5 | 2.2 |
| 12 | 30.15 | 29.79 | 29.957 | 64.0 | 1:30 P | 42.0 | 12 P | 53.0 | 54.3 | 48.0 | 10.0 |
| 13 | 30.30 | 30.15 | 30.266 | 53.0 | 4 P | 36.0 | 4:30 A | 44.5 | 43.6 | 39.0 | 9.4 |
| 14 | 30.34 | 30.23 | 30.317 | 61.0 | 4 P | 33.5 | 6 A | 47.3 | 47.0 | 43.0 | 12.2 |
| 15 | 30.32 | 30.11 | 30.221 | 63.0 | 3 P | 33.5 | 4 A | 48.3 | 47.9 | 42.3 | 9.5 |
| 16 | 30.11 | 29.87 | 29.975 | 69.0 | 3 P | 37.5 | 6 A | 53.3 | 52.2 | 40.7 | 9.8 |
| 17 | 29.97 | 29.90 | 29.969 | 67.0 | 3 P | 45.5 | 4 A | 56.0 | 53.2 | 46.0 | 9.0 |
| 18 | 29.97 | 29.72 | 29.835 | 69.5 | 4:30 P | 41.0 | 6 A | 55.3 | 55.2 | 45.3 | 12.4 |
| 19 | 29.75 | 29.53 | 29.609 | 74.5 | 4 P | 46.0 | 5:30 A | 60.3 | 59.7 | 50.5 | 8.6 |
| 20 | 29.99 | 29.57 | 29.781 | 72.0 | 2 P | 53.0 | 0:30 A | 62.5 | 61.0 | 50.7 | 10.7 |
| 21 | 30.43 | 29.99 | 30.305 | 63.0 | 5 P | 40.0 | 6 A | 51.5 | 50.0 | 39.5 | 12.3 |
| 22 | 30.51 | 30.38 | 30.477 | 61.0 | 1 P | 30.0 | 6 A | 45.5 | 46.4 | 39.5 | 10.3 |
| 23 | 30.38 | 30.10 | 30.199 | 69.0 | 5:30 P | 44.0 | 0 A | 56.5 | 53.7 | 50.0 | 6.5 |
| 24 | 30.31 | 30.16 | 30.280 | 69.0 | 3 P | 49.0 | 2 A | 59.0 | 56.7 | 48.0 | 8.2 |
| 25 | 30.23 | 30.02 | 30.157 | 88.0 | 3 P | 45.5 | 3 A | 66.7 | 57.5 | 47.0 | 9.7 |
| 26 | 30.22 | 29.85 | 29.993 | 80.5 | 6 P | 43.0 | 3 A | 61.7 | 61.7 | 53.0 | 9.0 |
| 27 | 30.06 | 29.80 | 29.921 | 88.0 | 4:30 P | 49.5 | 12 P | 68.7 | 70.9 | 58.0 | 10.2 |
| 28 | 30.08 | 29.91 | 30.004 | 54.0 | 4 P | 44.5 | 6 A | 49.3 | 48.5 | 46.0 | 0.0 |
| 29 | 29.91 | 29.52 | 29.697 | 75.0 | 4:30 P | 45.5 | 5 A | 60.3 | 57.0 | 53.3 | 6.9 |
| 30 | 29.71 | 29.60 | 29.669 | 56.0 | 0 A | 40.0 | 10 P | 48.0 | 46.9 | 44.0 | 0.0 |

# DAILY SUMMARY.

| Day. | Humidity. | | | Wind. | | | | | Precipitation. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Mean Dew Point. | Mean Force vapor. | Mean Relative Humidity. | Prevailing Direction. | Total Movement in Miles. | Maximum Pressure Per Square Ft | Miles per Hour. | Time. | Beginning. | Ending. | Total in Inches. | |
| | | | | | | | | | | | Rain.** | Snow. |
| 1 | 27.0 | .233 | 64.0 | N.W. | 229 | 5.0 | 32 | 3 P | | | | |
| 2 | 23.5 | .223 | 57.0 | N.W. | 116 | 2.0 | 20 | 5 P | 1 P | | T | T |
| 3 | 23.0 | .173 | 76.0 | N.N.E. | 282 | 12.5 | 50 | 10 P | 1 P | 12 P | .50 | 9.5 |
| 4 | 27.0 | .212 | 69.0 | N.N.W. | 461 | 8.0 | 40 | 7 A | | | | |
| 5 | 23.5 | .215 | 61.5 | W.N.W. | 75 | 1.5 | 17 | 7 P | | | | |
| 6 | 34.5 | .239 | 85.0 | S.W. | 53 | 1.0 | 14 | 0 A | 6 A | 2 P | .29 | |
| 7 | 32.5 | .279 | 68.0 | W. | 118 | 2.0 | 20 | 3 P | | | | |
| 8 | 28.5 | .357 | 44.5 | N.W. | 204 | 5.0 | 32 | 1 P | | | | |
| 9 | 34.5 | .345 | 59.0 | S.S.W. | 145 | 2.5 | 22 | 7 P | | | | |
| 10 | 49.5 | .423 | 84.0 | S.S.W. | 211 | 4.5 | 30 | 6 P | 4 A | 12 P | .20 | |
| 11 | 51.0 | .414 | 92.5 | S.S.W. | 158 | 5.0 | 32 | 11 P | 0 A | 11 P | 1.55 | |
| 12 | 43.5 | .395 | 74.0 | S.W. | 414 | 9.5 | 44 | 9 A | 6 P | | T | |
| 13 | 34.5 | .273 | 75.5 | N.W- | 210 | 4.0 | 28 | 9 A | | | | |
| 14 | 38.0 | .315 | 75.0 | W.N.W. | 223 | 4.5 | 30 | 12 M | | | | |
| 15 | 35.5 | .332 | 63.0 | E.N.E. | 140 | 3.0 | 24 | 12 M | | | | |
| 16 | 31.0 | .336 | 55.0 | N.E. | 72 | 2.0 | 20 | 6 P | | | | |
| 17 | 38.0 | .405 | 56.5 | N.N.W. | 197 | 4.0 | 28 | 4 P | | | | |
| 18 | 34.0 | .429 | 45.5 | N. | 323 | 10.0 | 45 | 7 A | | | | |
| 19 | 43.5 | .487 | 58.5 | N.N.W. | 62 | 1.5 | 17 | 2 P | | | | |
| 20 | 45.5 | .538 | 57.0 | N.N.E. | 241 | 6.5 | 36 | 1 P | | | | |
| 21 | 27.5 | .321 | 49.0 | N.N.E. | 225 | 6.5 | 36 | 7 A | | | | |
| 22 | 31.5 | .303 | 59.0 | S.E. | 105 | 8.0 | 40 | 2 P | 6 P | 8 P | T | |
| 23 | 47.0 | .415 | 80.0 | S.S.W. | 125 | 1.5 | 17 | 1 A | 8 A | 11 A | .02 | |
| 24 | 40.5 | .437 | 58.0 | S.E. | 77 | 2.0 | 20 | 12 P | | | | |
| 25 | 44.5 | .355 | 83.0 | N.N.W. | 165 | 3.5 | 26 | 2 P | | | | |
| 26 | 47.0 | .577 | 65.5 | S.S.W. | 103 | 1.0 | 14 | 9 A | | | | |
| 27 | 52.0 | .667 | 62.5 | N.N.W. | 148 | 4.5 | 30 | 12 M | 8 P | | T | |
| 28 | 43.5 | .375 | 85.0 | N.E. | 87 | 1.0 | 14 | 1 A | 8 A | | T | |
| 29 | 51.0 | .469 | 84.0 | N.N.E. | 122 | 1.5 | 17 | 6 P | 2 A | 8 P | .02 | |
| 30 | 42.0 | .311 | 87.0 | N.N.E. | 104 | 1.0 | 14 | 2 P | 7 A | 8 P | 1.41 | |

**Rain or meltedsnow at base of tower. *Included in following day.

## REMARKS

The weather during April was marked by a number of unusual features, the most noticeable of which was a heavy snowstorm on the 3d. This was much the deepest snowfall of the year, but owing its lightness it melted down to a comparatively small amount of water. It was the deepest snow recorded at this station since 1891, when eleven inches fell on the 3d of the month. Nearly all of the remaining precipitation occurred during two extremely heavy thunderstorms on the 11th and 30th.

The high temperatures recorded on the 25th and 27th were almost record breaking for this station.

The records of the various weather elements show the following features of interest: The mean barometer was slightly higher than the normal and the range about nine-tenths of the usual amount. The wind was more variable than usual although the total wind movement was considerably less than the normal.

The mean hourly temperature was more than three and one-half degrees above the normal making it the warmest April since this station was established, excepting only the year 1910, which was seven-tenths of a degree warmer.

The maximum temperature was the highest since 1896 and the minimum was practically normal giving a range of ten degrees more than usual. A mean hourly temperature of more than 70 degrees on the 27th was an exceptional record for April.

The mean dew point was rather high and the relative humidity practically normal. Only a few frosts were noted during the month.

The total precipitation was nearly an inch more than the normal, the two heavy thunderstorms giving about three-fourths of the total. The excess of precipitation for the first four months of the year, over the normal, is nearly four inches.

The sunshine record was practically normal, although only four days were recorded as clear.

J. E. OSTRANDER, Meteorologist.

R. E. McLAIN, Observer.

BULLETIN No. 317. MAY, 1915

# Meteorological Observations

AT THE

# MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.

*Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.*

*Height of Wind Instruments 72 ft.*

## MONTHLY SUMMARY.

### **Pressure.** In inches.

| | |
|---|---|
| Maximum reduced to freezing, | 29.98, 11th, 10 P. |
| Minimum reduced to freezing, | 29.16, 4th, 3 P. |
| Reduced† maximum reading, | 30.28, 11th, 10 P. |
| Reduced† minimum reading, | 29.45, 4th, 3 P. |
| Mean semi-daily reduced, | 29.905 |
| Monthly range, | 0.83 |

### ***Air Temperature.** In Degrees Fahr.

| | |
|---|---|
| Highest, | 80.0, 31st, 6P. |
| Lowest, | 34.0, 16th, 5:30 A. |
| Mean hourly, | 54.1 |
| Mean of means of max. and min., | 53.8 |
| Mean sensible (wet bulb), | 48.7 |
| Monthly range, | 46.0 |
| Highest mean daily, | 63.4, 8th |
| Lowest mean daily, | 44.6, 1st |
| Mean maximum, | 65.4 |
| Mean minimum, | 42.2 |
| Mean daily range, | 23.2 |
| Greatest daily range, | 43.5, 31st |
| Least daily range, | 3.0, 17th |

### Humidity.

| | |
|---|---|
| Mean dew point, | 43.3 |
| Mean force of vapor, | .430 |
| Mean relative humidity, | 66.8 |

### **Precipitation.** In inches.

| | |
|---|---|
| Total precipitation, | 1.20 |
| Number of days on which .01 inch or more rain fell | 11 |

### Wind.

| | |
|---|---|
| Total movement, | 4087m. |
| Greatest daily movement, | 343m., 27th |
| Least daily movement, | 15m., 2d |
| Mean daily movement, | 132 m |
| Mean hourly velocity, | 5.5 m. |

Maximum pressure per square foot, 8.5 lbs.= 41m. per hour, 9th, 9P., W.N.W.

Maximum velocity for 5 minutes, 27m. per hour, 26th, 9P., N.

Prevailing Direction, West Northwest.

### Summary.

| | |
|---|---|
| North Northwest | 13 per cent. |
| West Southwest | 10 " " |
| West | 13 " " |
| South | 13 " " |
| Northwest | 10 " " |
| West Northwest | 13 " " |
| Other directions | 28 " " |

### Weather.

| | |
|---|---|
| Mean cloudiness observed, | 46 per cent. |
| Total cloudiness recorded by the Sun Thermometer, | 180 hrs.=40 per cent. |
| Number of clear days, | 11 |
| Number of fair days, | 14 |
| Number of cloudy days, | 6 |

### Bright Sunshine.

Number of hours recorded. . . 273 hrs=60%.

**Rain,** 1st, 2d, 4th, 5th, 7th, 8th, 13th, 16th, 17th, 21st, 22d, 24th, 26th.

**Thunder and Lightning,** 21st.

**Frosts,** 15th, 16th, 20th.

**Gales,** 35 or more miles per hour: 39m., 7th, S; 41m., 9th, W.N.W.; 38m, 26th, N.; 39m., 27th, N.W.; 40m., 28th, W.N.W.

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* Temperature in ground shelter.

† Reduced to freezing and sea-level.

# DAILY SUMMARY.

| Day. | Barometer Reduced to Sea Level. | | | Temperature. Ground Shelter. | | | | | | | No. Hours of Bright Sunshine |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Maximun. | Minimum. | Mean. Semi-daily. | Maximum | Time. | Minimum. | Time. | Mean of Max. and Min. | Mean Hourly Draper. | Mean Sensible Wet Bulb. | |
| 1 | 29.86 | 29.70 | 29.771 | 50.0 | 4 P | 41.0 | 4 A | 45.5 | 44 6 | 43.0 | 0.8 |
| 2 | 29.92 | 29.82 | 29.901 | 56.5 | 4 P | 41.0 | 5 A | 48.7 | 48.3 | 46.0 | 4 2 |
| 3 | 29.85 | 29.68 | 29.781 | 59.5 | 3:30 P | 42.0 | 5 A | 50.7 | 49.8 | 45 5 | 10.0 |
| 4 | 29.68 | 29.45 | 29.538 | 64.0 | 3 P | 41.5 | 5:30 A | 52.7 | 52.5 | 49.3 | 9.9 |
| 5 | 29.79 | 29 49 | 29 657 | 60.0 | 3 P | 44.0 | 8 A | 52.0 | 50.2 | 46.3 | 6.0 |
| 6 | 30.03 | 29.79 | 29.962 | 68.5 | 5 P | 49.0 | 4 A | 58.7 | 57.5 | 50.3 | 11.0 |
| 7 | 30.10 | 29.72 | 29.969 | 71.0 | 12 M | 40.0 | 5:30 A | 55.5 | 57.3 | 50.5 | 7.1 |
| 8 | 29.69 | 29 62 | 29.656 | 75 0 | 4 P | 57 0 | 6 A | 66.0 | 63.4 | 58.3 | 7.6 |
| 9 | 29.91 | 29.61 | 29.735 | 68.0 | 1 P | 48.0 | 12 P | 58 0 | 58.8 | 51.7 | 12.1 |
| 10 | 30.10 | 29.91 | 30.054 | 64 0 | 3 P | 41.0 | 5 A | 52.5 | 53.3 | 45.5 | 13.2 |
| 11 | 30.28 | 30.10 | 30 247 | 73.0 | 4:30 P | 46.0 | 5:30 A | 59.5 | 58 8 | 47.7 | 12.9 |
| 12 | 30.26 | 29.90 | 30.093 | 72.5 | 1 P | 45.0 | 5:30 A | 58.7 | 60.2 | 53.0 | 9.4 |
| 13 | 29.90 | 29.66 | 29 746 | 68.0 | 4 P | 45 5 | 12 P | 56 7 | 59.1 | 54 7 | 6.7 |
| 14 | 29.87 | 29.76 | 29.825 | 68 0 | 3 P | 39 0 | 5 A | 53.5 | 52.6 | 44.0 | 11.9 |
| 15 | 29.85 | 29.72 | 29 803 | 64.0 | 4 P | 34 5 | 4 A | 49.3 | 51.1 | 44 3 | 12.5 |
| 16 | 29.96 | 29 85 | 29.925 | 57.0 | 2:30 P | 34.0 | 5:30 A | 45.5 | 47 1 | 43.0 | 9.0 |
| 17 | 29.92 | 29.84 | 29.874 | 47.0 | 5 P | 44 0 | 1 A | 45.5 | 45.1 | 43.7 | 0.0 |
| 18 | 29.96 | 29.87 | 29 926 | 59.0 | 2:30 P | 40.0 | 6 A | 49.5 | 49.5 | 47.0 | 8.8 |
| 19 | 30 16 | 29 96 | 30.050 | 63.0 | 4 P | 39.5 | 5 A | 51.3 | 50.8 | 46.5 | 10.1 |
| 20 | 30.22 | 30 11 | 30.179 | 70.0 | 3:30 P | 35.5 | 5 A | 52.7 | 55.0 | 48 5 | 11.4 |
| 21 | 30.27 | 29.94 | 30.189 | 57.5 | 10 A | 48.0 | 5 A | 52 7 | 51.6 | 47.7 | 0.3 |
| 22 | 29 99 | 29 75 | 29 845 | 77.5 | 2 P | 49.0 | 0 A | 63 3 | 62.0 | 59.5 | 1.0 |
| 23 | 30.05 | 29.82 | 29.972 | 64 0 | 1 P | 47.0 | 12 P | 55.5 | 54 0 | 49 7 | 10.1 |
| 24 | 30.03 | 29 87 | 29.953 | 64 5 | 10:30 A | 42.5 | 5 A | 53.5 | 54.0 | 52.0 | 7.9 |
| 25 | 30.04 | 29.91 | 29 982 | 78 0 | 4 P | 43.5 | 2:30 A | 60.7 | 61.2 | 56.0 | 12.1 |
| 26 | 29.97 | 29.66 | 29 845 | 60.0 | 8:30 A | 41.5 | 12 P | 50 7 | 53.4 | 50 3 | 1.1 |
| 27 | 30.09 | 29.87 | 30 000 | 61.5 | 3:30 P | 35.5 | 4 A | 48.5 | 49.5 | 41.0 | 13 2 |
| 28 | 29 88 | 29.70 | 29.790 | 71.0 | 4 P | 41.0 | 3:30 A | 56.0 | 57.0 | 46 0 | 12.6 |
| 29 | 29.89 | 29.73 | 29.822 | 68.0 | 5 P | 40 5 | 5 A | 54 3 | 55.3 | 48.5 | 13.6 |
| 30 | 29.99 | 29.89 | 29.925 | 68 0 | 4 P | 36.5 | 5 A | 62.3 | 52 7 | 48.0 | 13.1 |
| 31 | 30.10 | 29.99 | 30.049 | 80.0 | 6 P | 36 5 | 5:30 A | 58 3 | 60.6 | 52.0 | 13.7 |

# DAILY SUMMARY.

| Day. | Humidity. | | | Wind. | | | | | Precipitation. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Mean Dew Point. | Mean Force vapor. | Mean Relative Humidity. | Prevailing Direction. | Total Movement in Miles. | Maximum Pressure Per Square Ft | Miles per Hour. | Time. | Beginning. | Ending. | Total in Inches. Rain.** | Total in Inches. Snow. |
| 1 | 41.0 | .297 | 87.0 | N.N.E. | 161 | 2.5 | 22 | 12 M | 12 M | 12 P | .01 | |
| 2 | 44.5 | .331 | 89.5 | N.N.E. | 15 | 0.0 | — | — | 0 A | 12 P | T | |
| 3 | 42.0 | .347 | 76.5 | N.N.W. | 172 | 3.0 | 24 | 7 A | | | | |
| 4 | 44.5 | .417 | 71.5 | S.W. | 65 | 1.5 | 17 | 3 P | 8 P | | T | |
| 5 | 43.5 | .351 | 82.0 | S.E. | 67 | 0.5 | 10 | 6 P | 4 A | 12 M | .06 | |
| 6 | 44.0 | .459 | 63.0 | W.N.W. | 97 | 2.0 | 20 | 4 P | | | | |
| 7 | 46.5 | .463 | 69.5 | S.S.W. | 126 | 7.5 | 39 | 5 P | 2 P | 12 P | .03 | |
| 8 | 56.0 | .557 | 81.5 | S.W. | 212 | 3.0 | 24 | 3 P | 0 A | 6 P | .31 | |
| 9 | 64.0 | .490 | 65.5 | W. | 218 | 8.5 | 41 | 9 P | | | | |
| 10 | 30.5 | .413 | 48.0 | W. | 197 | 4.0 | 28 | 4 P | | | | |
| 11 | 36.5 | .480 | 45.5 | W. | 124 | 1.0 | 14 | 3 P | | | | |
| 12 | 48.0 | .511 | 67.5 | S.S.W. | 187 | 4.0 | 28 | 5 P | | | | |
| 13 | 51.0 | .517 | 72.0 | W.S.W. | 143 | 4.0 | 28 | 6 P | 9:30 A | 3 P | .01 | |
| 14 | 32.0 | .407 | 45.5 | W.N.W. | 70 | 3.0 | 24 | 4 P | | | | |
| 15 | 33.5 | .397 | 49.5 | N.N.W. | 143 | 4.0 | 28 | 2 P | | | | |
| 16 | 35.5 | .348 | 60.5 | W.N.W. | 88 | 4.0 | 28 | 7 A | 4 P | 12 P | .02 | |
| 17 | 41.5 | .307 | 85.0 | S. | 49 | 1.0 | 14 | 1 A | 0 A | 3 P | .05 | |
| 18 | 43.0 | .371 | 75.5 | W.N.W. | 98 | 1.5 | 17 | 3 P | | | | |
| 19 | 41.0 | .376 | 69.5 | N.W- | 212 | 5.0 | 32 | 12 M | | | | |
| 20 | 39.5 | .462 | 54.0 | N.N.W. | 66 | 2.0 | 20 | 1 P | | | | |
| 21 | 43.5 | .390 | 74.5 | E.S.E. | 50 | 1.0 | 14 | 3 P | 10 A | 12 P | .46 | |
| 22 | 58.0 | .558 | 87.5 | S.S.W. | 182 | 3.5 | 26 | 0 A | 0 A | 10 P | .04 | |
| 23 | 43.5 | .457 | 63.0 | N.W. | 212 | 5.5 | 33 | 9 A | | | | |
| 24 | 49.5 | .437 | 79.0 | W.S.W. | 39 | 1.5 | 17 | 11 A | 4:30 P | 5:30 P | .02 | |
| 25 | 51.0 | .528 | 64.5 | W.S.W. | 73 | 3.5 | 26 | 7 P | | | | |
| 26 | 46.5 | 426 | 74.0 | W. | 184 | 7.0 | 38 | 9 P | 9 A | 5 P | .19 | |
| 27 | 33.5 | .338 | 59.0 | N.N.W. | 343 | 7.5 | 39 | 12 M | | | | |
| 28 | 34.0 | .450 | 44.5 | N.W. | 294 | 8.0 | 40 | 2 P | | | | |
| 29 | 40.5 | .455 | 56.0 | E. | 99 | 1.5 | 17 | 6 P | | | | |
| 30 | 40.0 | .441 | 57.0 | S.S.W. | 57 | 1.5 | 17 | 9 A | | | | |
| 31 | 43.0 | .543 | 54.5 | S. | 54 | 1.0 | 14 | 8 P | | | | |

**Rain or melted snow at base of tower. *Included in following day.

# REMARKS

The weather during May was abnormally cool although the amount of sunshine was considerably more than the normal. On more than two thirds of the days the maximum temperature was below 70 degrees and the maximum temperature was 8 degrees lower than the April maximum and then did not occur until the last day of the month. The precipitation was comparatively small but was fairly well distributed throughout the month.

An analysis of the records of the various weather elements shows the following features of interest: The mean barometer was much below the normal while the range was about the average amount. Notwithstanding the prevailing low barometer the amount of fair weather was well above the average for May. The total wind movement was about nine-tenths of the normal amount.

The mean temperature was three and one-half degrees below the normal making it the coolest May, with one exception, since this station was established. May, 1907, was however more than two degrees cooler, having a mean temperature of 51.8 degrees. The maximum temperature was 7 degrees lower than usual and the minimum more than 3 degrees higher than normal giving a very small range for the month.

The mean dew point was very low for the season and the relative humidity well below the normal. The total precipitation was about one third of the normal amount and occurred as small storms on numerous dates. Only one thunder storm was noted.

The rate of progress of the season was slow during the month and at the close of the month the season was slightly backward.

J. E. OSTRANDER, Meteorologist.

R. E. McLAIN, Observer.

**BULLETIN No. 318.** **JUNE, 1915**

# Meteorological Observations

AT THE

# MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.
*Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.*
*Height of Wind Instruments 72 ft.*

## MONTHLY SUMMARY.

### Pressure. In inches.

| | |
|---|---|
| Maximum reduced to freezing, | 29.94, 5th, 9 P. 28th, 8 A. |
| Minimum reduced to freezing, | 29.30, 23d, 3 A. |
| Reduced† maximum reading, | 30.23, 5th, 9 P. 28th 8 A. |
| Reduced† minimum reading, | 29.60, 23d, 3 A. |
| Mean semi-daily reduced, | 30.020 |
| Monthly range, | 0.64 |

### *Air Temperature. In Degrees Fahr.

| | |
|---|---|
| Highest, | 89.0, 14th, 3.30 P. |
| Lowest, | 37.0, 4th, 5 A. |
| Mean hourly, | 64.2 |
| Mean of means of max. and min., | 64.5 |
| Mean sensible (wet bulb), | 57.7 |
| Monthly range, | 52.0 |
| Highest mean daily, | 72.0, 14th |
| Lowest mean daily, | 55.5, 2d |
| Mean maximum, | 76.9 |
| Mean minimum, | 52.1 |
| Mean daily range, | 24.8 |
| Greatest daily range, | 40.0, 1st |
| Least daily range, | 7.5, 15th |

### Humidity.

| | |
|---|---|
| Mean dew point, | 53.4 |
| Mean force of vapor, | .593 |
| Mean relative humidity, | 71.4 |

### Precipitation. In inches.

| | |
|---|---|
| Total precipitation, | 3.00 |
| Number of days on which .01 inch or more rain fell | 8 |

*Temperature in ground shelter.
† Reduced to freezing and sea-level.

### Wind.

| | |
|---|---|
| Total movement, | 2439m. |
| Greatest daily movement, | 225m., 12th |
| Least daily movement, | 48m., 1st |
| Mean daily movement, | 114 m. |
| Mean hourly velocity, | 4.8m. |
| Maximum pressure per square foot, | 19.5 lbs.=62m. per hour, 19th, 2P., S.S.W. |
| Maximum velocity for 5 minutes, | 24m. per hour, 11th, 5P., S. S.W. |

Prevailing Direction, South Southeast.

### Summary.

| | |
|---|---|
| North Northeast | 13 per cent. |
| South Southwest | 17 " " |
| East | 13 " " |
| East Northeast | 10 " " |
| Southwest | 13 " " |
| West Northwest | 10 " " |
| Other directions | 24 " " |

### Weather.

| | |
|---|---|
| Mean cloudiness observed, | 41 per cent. |
| Total cloudiness recorded by the Sun Thermometer, | 188 hrs.=42 per cent. |
| Number of clear days, | 8 |
| Number of fair days, | 18 |
| Number of cloudy days, | 4 |

### Bright Sunshine.

Number of hours recorded, . . 269 hrs.=58%.

**Rain**, 7st, 8th, 15th, 17th, 19th, 20th, 23d, 26th, 27th, 30th.

**Thunder and Lightning**, 15st, 17th, 20th, 26th;

**Gales**, 35 or more miles per hour: 36m., 10th, N.; 40m., 11th, S.S.W.; 62m., 19th, S.S.W.

# DAILY SUMMARY.

| Day. | Barometer Reduced to Sea Level. | | | Temperature. Ground Shelter. | | | | | | | No. Hours of Bright Sunshine |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Maximun. | Minimum. | Mean. Semi-daily. | Maximum | Time. | Minimum. | Time. | Mean of Max. and Min. | Mean Hourly Draper. | Mean Sensible Wet Bulb. | |
| 1 | 30.09 | 29 96 | 30.036 | 84.0 | 4:30 P | 44.0 | 5 A | 64 0 | 65.5 | 55.7 | 12.3 |
| 2 | 30.19 | 30.00 | 30.151 | 64 0 | 1 P | 42.5 | 12 P | 53.3 | 55 5 | 46 5 | 10.6 |
| 3 | 30.20 | 30.11 | 30.171 | 66.5 | 1:30 P | 40.0 | 1 A | 53.3 | 56 6 | 49.0 | 9.4 |
| 4 | 30.18 | 30.08 | 30.146 | 75 0 | 3 P | 37.0 | 5 A | 56 0 | 57.6 | 50.0 | 12.7 |
| 5 | 30.23 | 30.14 | 30.196 | 77.5 | 1 P | 43.0 | 5 A | 60 3 | 61.0 | 52.0 | 12.5 |
| 6 | 30.19 | 30 00 | 30.060 | 74.5 | 1:30 A | 51.0 | 5 A | 62.7 | 63.3 | 57.0 | 6 8 |
| 7 | 30.00 | 29.86 | 29.933 | 79.0 | 2:30 P | 62.0 | 4 A | 70.5 | 68.5 | 63.5 | 8 9 |
| 8 | 29.91 | 29.81 | 29.848 | 81.0 | 5 P | 58 0 | 12 P | 69 5 | 66.3 | 61.0 | 6.8 |
| 9 | 29 90 | 29.78 | 29 845 | 79.0 | 2 P | 54.0 | 4 A | 66.5 | 65.8 | 56.5 | 11 2 |
| 10 | 30 11 | 29.87 | 30.046 | 73.0 | 2:30 P | 52.0 | 4:30 A | 62.5 | 62 0 | 51.5 | 11.1 |
| 11 | 30.09 | 29.83 | 29 942 | 75.0 | 1 P | 51.0 | 4 A | 63 0 | 63.3 | 54.7 | 10.2 |
| 12 | 30.12 | 29.81 | 29.959 | 78.0 | 4 P | 55 5 | 12 P | 66.7 | 67.7 | 62.7 | 12.3 |
| 13 | 30.22 | 30 09 | 30 158 | 80.0 | 1:30 P | 48.0 | 5 A | 64.0 | 64.5 | 58.0 | 10.1 |
| 14 | 30.10 | 30.04 | 30.078 | 89.0 | 3:30 P | 59.5 | 4 A | 74.3 | 72 0 | 66.7 | 10.8 |
| 15 | 30.16 | 30.00 | 30 098 | 65.0 | 5:30 A | 57.5 | 12 P | 61.3 | 60.7 | 58 5 | 0.0 |
| 16 | 30.17 | 30 06 | 30.121 | 82.0 | 3:30 P | 57.0 | 5 A | 69 5 | 68.7 | 66.5 | 10 2 |
| 17 | 30.13 | 30.02 | 30.082 | 79 0 | 4:30 P | 62 0 | 12 P | 70.5 | 67.9 | 63.3 | 4.5 |
| 18 | 30.19 | 30.06 | 30 124 | 86 5 | 2:30 P | 55.0 | 4:30 A | 70.7 | 71.8 | 65.5 | 12.6 |
| 19 | 30.09 | 29 93 | 30.004 | 81 0 | 2 P | 62.0 | 6 P | 71.5 | 68.5 | 64 5 | 7.3 |
| 20 | 29.99 | 29 93 | 29 971 | 73.0 | 6 P | 58.0 | 12 P | 65 5 | 64.8 | 61.0 | 6 1 |
| 21 | 30.03 | 29.89 | 29.981 | 76.0 | 3 P | 51.5 | 5:30 A | 63.7 | 63.0 | 57.0 | 12 5 |
| 22 | 29 92 | 29.64 | 29 784 | 74 0 | 1:30 P | 49 5 | 5:30 A | 61.7 | 60.3 | 51.7 | 6.5 |
| 23 | 29.78 | 29.60 | 29.716 | 75 0 | 3 P | 53 0 | 11:30 P | 64.0 | 61.1 | 54.7 | 7.7 |
| 24 | 29.94 | 29 78 | 29 885 | 72.0 | 3 P | 52.0 | 4 A | 62.0 | 62.1 | 55 3 | 12 4 |
| 25 | 30.00 | 29 92 | 29 990 | 77.0 | 3 P | 50 0 | 5:30 A | 63.5 | 62.2 | 55.0 | 7 4 |
| 26 | 30.08 | 29 97 | 30 040 | 76 0 | 6 P | 52.0 | 3 A | 64 0 | 62.4 | 59.0 | 8.9 |
| 27 | 30.20 | 30.08 | 30.146 | 73.0 | 10:30 A | 47 5 | 5 A | 60 3 | 59.2 | 52.5 | 4 5 |
| 28 | 30.23 | 30 10 | 30.169 | 83 5 | 3 P | 47.0 | 4:30 A | 65.3 | 66 2 | 58 0 | 12.3 |
| 29 | 30.12 | 29 94 | 30.034 | 84 0 | 4 P | 53 0 | 5 A | 68.5 | 69.7 | 62.3 | 10 7 |
| 30 | 29 97 | 29.82 | 29.890 | 75 0 | 1 P | 59.5 | 3:30 A | 67.3 | 66.4 | 63 0 | 0.0 |

# DAILY SUMMARY.

| Day. | Humidity. | | | Wind. | | | | | Precipitation. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Mean Dew Point. | Mean Force vapor. | Mean Relative Humidity. | Prevailing Direction. | Total Movement in Miles. | Maximum Pressure Per Square Ft | Miles per Hour. | Time. | Beginning. | Ending. | Total in Inches. Rain.** | Total in Inches. Snow. |
| 1 | 48.5 | .619 | 57.0 | S. | 48 | 0.5 | 10 | 10 P | | | | |
| 2 | 38.5 | .415 | 58.0 | E. | 149 | 3.0 | 24 | 6 A | | | | |
| 3 | 43.0 | .432 | 65.0 | E.N.E. | 140 | 1.5 | 17 | 1 P | | | | |
| 4 | 43.0 | .477 | 58.5 | N.E. | 61 | 1.5 | 17 | 2 P | | | | |
| 5 | 46.0 | .515 | 60.0 | E.N.E. | 58 | 1.0 | 14 | 12 M | | | | |
| 6 | 52.5 | .575 | 69.0 | E.N.E. | 170 | 3.0 | 24 | 9 A | | | | |
| 7 | 61.0 | .671 | 81.0 | E. | 84 | 1.0 | 14 | 3 A | 0 A | 12 P | T | |
| 8 | 58.0 | .616 | 80.0 | S.W. | 110 | 1.0 | 14 | 3 P | 7 A | 11 A | .12 | |
| 9 | 49.5 | .643 | 55.0 | N.N.W. | 79 | 0.5 | 10 | 7 A | | | | |
| 10 | 45.5 | .501 | 61.0 | N.N.E. | 191 | 6.5 | 36 | 2 P | | | | |
| 11 | 47.5 | .582 | 57.0 | S.S.W. | 164 | 8.0 | 40 | 6 P | | | | |
| 12 | 57.5 | .744 | 64.0 | W.N.W. | 225 | 4.0 | 28 | 12 M | | | | |
| 13 | 53.0 | .613 | 66.5 | S.S.W. | 116 | 4.5 | 30 | 3 P | | | | |
| 14 | 66.0 | .700 | 92.5 | E. | 99 | 1.5 | 17 | 2 P | | | | |
| 15 | 58.0 | .513 | 92.0 | E | 66 | 0.5 | 10 | 4 A | 8 A | 11 P | .73 | |
| 16 | 64.5 | .740 | 83.5 | S. | 69 | 0.5 | 10 | 4 P | | | | |
| 17 | 61.5 | .633 | 87.5 | S.S.W. | 102 | 1.0 | 14 | 3 P | 4 A | 6 P | .66 | |
| 18 | 62.0 | .776 | 73.0 | S.S.W. | 113 | 1.0 | 14 | 9 P | | | | |
| 19 | 63.0 | .655 | 88.5 | S.S.W. | 189 | 19.5 | 62 | 2 P | 4 P | 12 P | .12 | |
| 20 | 59.0 | .595 | 85.0 | N.W. | 141 | 4.0 | 28 | 7 P | 2 A | 12 M | 1.00 | |
| 21 | 57.5 | .588 | 82.0 | N.N.E. | 204 | 4.5 | 30 | 11 A | | | | |
| 22 | 46.5 | .470 | 68.5 | S.W. | 98 | 2.0 | 20 | 6 P | | | | |
| 23 | 51.5 | .494 | 77.5 | N.N.E. | 125 | 5.5 | 33 | 2 P | 3 P | 6 P | .03 | |
| 24 | 49.5 | .542 | 64.0 | N.N.E. | 179 | 3.5 | 26 | 9 A | | | .19 | |
| 25 | 50.0 | .548 | 66.0 | W.N.W. | 59 | 1.0 | 14 | 3 P | | | | |
| 26 | 55.5 | .588 | 76.0 | S.E. | 66 | 1.5 | 17 | 12 M | 5 A | 1 P | .30 | |
| 27 | 47.0 | .494 | 67.5 | W.N.W. | 60 | 5.5 | 33 | 1 P | 11 A | | T | |
| 28 | 51.5 | .653 | 60.0 | N.W. | 62 | 0.5 | 10 | 8 A | | | | |
| 29 | 57.0 | .752 | 62.0 | S.W. | 75 | 1.5 | 17 | 7 P | | | | |
| 30 | 60.5 | .647 | 83.5 | S.W. | 137 | 2.5 | 22 | 4 P | 12 M | 4 P | .04 | |

**Rain or melted snow at base of tower.     *Included in following day.

# REMARKS

The weather during June was generally pleasant and devoid of any abnormal features of importance. While there were no periods of excessive heat the amount of bright sunshine was unusually large.

No precipitation of consequence occurred until about the middle of the month although the total amount was but little under the normal.

An examinatian in detail of the several weather records shows the following as the principal features: The mean barometer was considerably above the normal while the range of pressure was small even for a month when small ranges are expected. As a result of the steady barometric pressure the wind movement was less than the normal. Nearly one half the days showed a prevailing wind direction from some one of the eastern points of the compass, giving a very unusual record for the prevailing direction for the month.

The mean temperature for the month was nearly two degrees lower than the normal and the maximum and minimum records were both lower than the average values for these records, leaving the range equal to the normal amount. On only two days was the mean hourly temperature above 70 degrees and on but four days was it below 60 degrees.

The mean dew point and relative humidity were both lower than the normal value for these elements.

The total precipitation, while slightly less than the normal, consisted mainly of three storms totaling more than 80 per cent of the whole amount.

J. E. OSTRANDER, Meteorologist.

D. POTTER, Observer.

BULLETIN No. 319. JULY, 1915

# Meteorological Observations

AT THE

# MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.
*Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.*
*Height of Wind Instruments 72 ft.*

## MONTHLY SUMMARY.

**Pressure.** In inches.

| | |
|---|---|
| Maximum reduced to freezing, | 29 93,24th, 8 A. 28th, 8 A. |
| Minimum reduced to freezing, | 29.19, 8th, 7 P. |
| Reduced† maximum reading, | 30.22, 24th, 8 A. |
| Reduced† minimum reading, | 29.,48 8th, 7P. |
| Mean semi-daily reduced, | 29.923 |
| Monthly range, | 0.74 |

***Air Temperature.** In Degrees Fahr.

| | |
|---|---|
| Highest, | 91.0, 31st, 3 P. |
| Lowest, | 48.0, 7th, 4:30 A. |
| Mean hourly, | 68.9 |
| Mean of means of max. and min., | 69.9 |
| Mean sensible (wet bulb), | 64.5 |
| Monthly range, | 43.0 |
| Highest mean daily, | 76.9, 31st |
| Lowest mean daily, | 61.2, 2d |
| Mean maximum, | 80.4 |
| Mean minimum, | 59.6 |
| Mean daily range, | 20.8 |
| Greatest daily range, | 31.5, 13th |
| Least daily range, | 7.0, 1st |

**Humidity.**

| | |
|---|---|
| Mean dew point, | 62.1 |
| Mean force of vapor, | .697 |
| Mean relative humidity, | 82.1 |

**Precipitation.** In inches.

| | |
|---|---|
| Total precipitation, | 9.13 |
| Number of days on which .01 inch or more rain fell | 20 |

**Wind.**

| | |
|---|---|
| Total movement, | 2908m. |
| Greatest daily movement, | 251m., 9th |
| Least daily movement, | 21m., 15th |
| Mean daily movement, | 94 m. |
| Mean hourly velocity, | 3.9m. |

Maximum pressure per square foot, 16.0 lbs.= 57m. per hour, 5th, 9A., S.S.E.

Maximum velocity for 5 minutes, 48m. per hour, 5th, 10A., S. S.E.

Prevailing Direction, Southwest.

Summary.

| | |
|---|---|
| South Southwest | 29 per cent. |
| South | 10 " " |
| West Southwest | 10 " " |
| Northwest | 10 " " |
| Other directions | 41 " " |

**Weather.**

| | |
|---|---|
| Mean cloudiness observed, | 49 per cent. |
| Total cloudiness recorded by the Sun Thermometer, | 271 hrs.=59 per cent. |
| Number of clear days, | 0 |
| Number of fair days, | 17 |
| Number of cloudy days, | 14 |

**Bright Sunshine.**

Number of hours recorded, . . 191 hrs.=41%.

**Rain**, 1st, 2d, 3d, 4th, 5th, 7th, 8th, 9th, 11th, 12th, 14th, 16th, 18th, 19th, 21st, 22d, 26th, 27th, 30th, 31st.

**Thunder and Lightning**, 8th, 26th, 30th, 31st.

**Gales**, 35 or more miles per hour: 57m., 5th, S.S.E.; 41m., 8th, N N.W.; 38m., 9th, N.W.

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*Temperature in ground shelter.

† Reduced to freezing and sea-level.

# DAILY SUMMARY.

| Day. | Barometer Reduced to Sea Level. | | | Temperature. Ground Shelter. | | | | | | | No. Hours of Bright Sunshine. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Maximun. | Minimum. | Mean, Semi-daily. | Maximum | Time. | Minimum. | Time. | Mean of Max. and Min. | Mean Hourly Draper. | Mean Sensible Wet Bulb. | |
| 1 | 29.79 | 29.61 | 29.683 | 69.0 | 10:30 A | 62.0 | 12 P | 65.5 | 65.2 | 64.0 | 0.0 |
| 2 | 29.82 | 29.71 | 29.813 | 65.5 | 3 P | 57.5 | 12 P | 61.5 | 61.2 | 59.7 | 0.0 |
| 3 | 29.88 | 29.78 | 29.848 | 83.0 | 5:30 P | 56.5 | 4:30 A | 69.7 | 68.2 | 63.0 | 9.4 |
| 4 | 30.00 | 29.88 | 29.984 | 81.0 | 2:30 P | 63.5 | 5:30 A | 72.3 | 72.5 | 68.3 | 8.7 |
| 5 | 29.90 | 29.65 | 29.759 | 78.0 | 3 P | 61.0 | 12 P | 69.5 | 69.0 | 65.5 | 2.2 |
| 6 | 30.08 | 29.82 | 30.004 | 71.0 | 5 P | 52.5 | 12 P | 61.7 | 63.2 | 56.0 | 8.8 |
| 7 | 30.15 | 30.00 | 30.098 | 76.5 | 3 P | 48.0 | 4:30 A | 62.3 | 64.2 | 59.5 | 6.8 |
| 8 | 30.02 | 29.48 | 29.720 | 68.0 | 4 P | 60.5 | 12 P | 64.3 | 63.3 | 61.3 | 0.0 |
| 9 | 29.89 | 29.59 | 29.817 | 78.0 | 3 P | 55.5 | 12 P | 66.7 | 65.3 | 58.7 | 9.3 |
| 10 | 29.96 | 29.87 | 29.926 | 80.5 | 4:30 P | 52.5 | 4 A | 66.5 | 68.1 | 63.7 | 9.2 |
| 11 | 29.96 | 29.83 | 29.916 | 82.5 | 2 P | 58.0 | 5 A | 70.3 | 70.5 | 63.7 | 7.2 |
| 12 | 29.89 | 29.75 | 29.812 | 76.0 | 6 P | 58.0 | 3:30 A | 67.0 | 64.0 | 61.5 | 4.1 |
| 13 | 29.84 | 29.74 | 29.824 | 88.0 | 4:30 P | 56.5 | 5 A | 72.3 | 71.9 | 66.3 | 10.6 |
| 14 | 29.86 | 29.78 | 29.850 | 84.5 | 4 P | 61.0 | 4:30 A | 72.7 | 70.0 | 66.0 | 8.1 |
| 15 | 29.90 | 29.81 | 29.870 | 87.5 | 3:30 P | 62.0 | 2:30 A | 74.7 | 72.3 | 66.7 | 6.1 |
| 16 | 29.85 | 29.65 | 29.778 | 85.0 | 2:30 P | 61.5 | 4 A | 73.3 | 72.9 | 68.3 | 6.1 |
| 17 | 29.70 | 29.54 | 29.617 | 85.0 | 4 P | 69.0 | 12 P | 77.0 | 75.3 | 73.0 | 2.2 |
| 18 | 29.89 | 29.70 | 29.864 | 84.0 | 2:30 P | 63.0 | 5 A | 73.5 | 73.1 | 67.0 | 11.8 |
| 19 | 29.92 | 29.75 | 29.884 | 85.0 | 1 P | 65.0 | 5 A | 75.0 | 73.3 | 67.0 | 2.2 |
| 20 | 29.95 | 29.82 | 29.948 | 78.0 | 3 P | 61.0 | 5 A | 69.5 | 69.0 | 62.5 | 6.9 |
| 21 | 30.02 | 29.90 | 29.958 | 72.5 | 11:30 A | 60.5 | 4 A | 66.5 | 64.9 | 60.0 | 0.8 |
| 22 | 30.14 | 30.02 | 30.120 | 75.0 | 2 P | 60.0 | 3 A | 67.5 | 65.8 | 60.5 | 4.2 |
| 23 | 30.18 | 30.09 | 30.166 | 80.5 | 3 P | 53.5 | 3 A | 67.0 | 66.8 | 62.5 | 9.6 |
| 24 | 30.22 | 30.13 | 30.211 | 81.0 | 1 P | 54.0 | 4 A | 67.5 | 66.0 | 61.0 | 7.3 |
| 25 | 30.21 | 30.08 | 30.182 | 82.5 | 3:30 P | 54.0 | 5:30 A | 68.3 | 68.5 | 64.5 | 8.9 |
| 26 | 30.19 | 30.06 | 30.144 | 81.0 | 1 P | 60.0 | 5 A | 70.5 | 67.7 | 62.7 | 4.2 |
| 27 | 30.08 | 30.03 | 30.078 | 82.5 | 4 P | 64.0 | 6:30 A | 73.3 | 70.8 | 67.0 | 6.7 |
| 28 | 30.10 | 29.93 | 30 052 | 83.5 | 3 P | 58.0 | 5 A | 70.7 | 70 3 | 66.3 | 5.6 |
| 29 | 29.93 | 29.80 | 29.888 | 87.0 | 3:30 P | 66.0 | 4 A | 76.5 | 73 9 | 69.3 | 7.4 |
| 30 | 29.92 | 29.83 | 29.896 | 89 5 | 4:30 P | 60.5 | 5 A | 75.0 | 74.6 | 69.5 | 11.0 |
| 31 | 29.94 | 29.87 | 29.926 | 91.0 | 3 P | 71.0 | 5:30 A | 81.0 | 76.9 | 74.5 | 5.1 |

# DAILY SUMMARY.

| | Humidity. | | | Wind. | | | | | Precipitation. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Total in Inches. | |
| Day. | Mean Dew Point. | Mean Force vapor. | Mean Relative Humidity. | Prevailing Direction. | Total Movement in Miles. | Maximum Pressure Per Square Ft | Miles per Hour. | Time. | Beginning. | Ending. | Rain.** | Snow. |
| 1 | 63.0 | .631 | 91.0 | E. | 137 | 2.0 | 20 | 2 P | 2 A | 3 P | 1.55 | |
| 2 | 58.5 | .582 | 94.0 | N.N.E. | 63 | 0.5 | 10 | 8 P | 1 A | 12 P | 1.22 | |
| 3 | 60.5 | .675 | 80.0 | W.S.W. | 71 | 1.5 | 17 | 10 P | 10 P | 12 P | .05 | |
| 4 | 66.0 | .786 | 82.0 | S.S.W. | 77 | 1.5 | 17 | 7 P | 0 A | 2 A | .03 | |
| 5 | 63.5 | .729 | 80.0 | W. | 174 | 16.0 | 57 | 9A | 9A | 12 M | .13 | |
| 6 | 50.5 | .579 | 63.0 | W.N.W. | 206 | 3.5 | 26 | 2 P | | | | |
| 7 | 55.0 | .629 | 71.0 | S.S.W. | 77 | 1.5 | 17 | 1 P | 7 P | | T | |
| 8 | 60.5 | .570 | 92.0 | E.S.E. | 149 | 8.5 | 41 | 6 P | 6 A | 10 P | 3.10 | |
| 9 | 55.0 | .608 | 72.0 | N.W. | 251 | 7.0 | 38 | 6 P | 6 P | 8 P | .01 | |
| 10 | 59.5 | .763 | 66.0 | S.S.W. | 117 | 2.0 | 20 | 12 M | | | | |
| 11 | 59.0 | .794 | 63.0 | S.W. | 101 | 1.0 | 14 | 5 P | 10 P | 12 P | .10 | |
| 12 | 60.5 | .580 | 91.0 | W.S.W. | 67 | 0.5 | 10 | 2 A | 0 A | 11 A | .43 | |
| 13 | 63.0 | .771 | 75.0 | S.W. | 65 | 1.0 | 14 | 1 P | | | | |
| 14 | 64.0 | .715 | 84.5 | S. | 43 | 2.5 | 22 | 5 P | 1 P | 6 P | .21 | |
| 15 | 65.0 | .729 | 87.0 | S. | 21 | 0.5 | 10 | 4 P | | | | |
| 16 | 65.5 | .827 | 80.5 | S. | 97 | 3.5 | 26 | 3 P | 4 P | 6 P | .01 | |
| 17 | 71.5 | .864 | 88.5 | W.N.W. | 134 | 2.0 | 20 | 5 P | | | | |
| 18 | 63.5 | .804 | 75.5 | N.W. | 83 | 2.0 | 20 | 3 P | 9 P | 11 P | .04 | |
| 19 | 65.0 | .739 | 84.5 | S.S.W. | 82 | 5.0 | 32 | 3 P | 3 P | 10 P | .71 | |
| 20 | 59.0 | .686 | 73.5 | N.E. | 87 | 1.5 | 17 | 9 A | | | | |
| 21 | 57.5 | .593 | 80.0 | N.N.E. | 78 | 0.5 | 10 | 11 A | 4 P | 12 P | .13 | |
| 22 | 58.5 | .544 | 83.0 | S.S.W. | 78 | 1.5 | 17 | 5 P | 10 A | 4 P | .01 | |
| 23 | 60.5 | .622 | 87.5 | S.S.E. | 63 | 0.5 | 10 | 5 P | | | | |
| 24 | 59.0 | .585 | 54.5 | S.S.W. | 78 | 0.5 | 10 | 3 P | | | | |
| 25 | 63.5 | .659 | 90.0 | S.S.W. | 94 | 1.0 | 14 | 1 P | | | | |
| 26 | 62.0 | .627 | 88.5 | S.S.W. | 77 | 1.5 | 17 | 1 P | 2 P | 12 P | .20 | |
| 27 | 65.5 | .718 | 88.0 | N. | 68 | 0.5 | 10 | 10 A | 0 A | 2 A | .03 | |
| 28 | 64.5 | .685 | 88 5 | S.S.W. | 68 | 1.5 | 17 | 10 P | 6 P | 11 P | .50 | |
| 29 | 68.0 | .778 | 88.0 | W.S.W. | 111 | 0.5 | 10 | 11 A | | | | |
| 30 | 67 5 | .838 | 81.5 | W. | 49 | 0.0 | — | — | 11 P | 12 P | .10 | |
| 31 | 73.5 | .914 | 91.0 | N.W. | 42 | 2.5 | 22 | 2 P | 0 A | 4 P | .57 | |

**Rain or meltedsnow at base of tower. *Included in following day.

## REMARKS

The weather, during July, was abnormal in many respects, but by far the most noticeable feature was the excessive precipitation. Starting with nearly three inches of rain on the first two days of the month, and within a week, another day with more than three inches in a single storm, the precipitation continued to occur throughout the month on more than half the days, giving a total of more than twice the July normal. Excepting the year 1897, when 14.51 inches was recorded in July, the precipitation this month was the largest for twenty-five years. As might be inferred from the excessive moisture of the month, the relative humidity was nearly ten per cent more than the normal.

A comparison of the records of the several weather elements with the normals for a period of twenty-five years shows the following as the most important features: The mean barometer was comparatively low and the changes in pressure generally slow and small. The range of pressure was practically normal. The total wind movement was about 20 per cent less than normal and more than usual was from the southwest quadrant. The mean hourly temperature was nearly two degrees lower than the normal and the maximum temperature did not reach 90 degrees until the last day of the month. Notwithstanding the absence of especially high temperatures the last week of the month was especially oppressive and sultry. The minimum temperature was nearly three degrees higher than usual giving a comparatively small range for the month.

The mean dewpoint was comparatively high as would be inferred from the high relative humidity referred to above.

Nearly one half the days were cloudy and not a single clear day was noted.

J. E. OSTRANDER, Meteorologist.

DAVID POTTER, Observer.

**BULLETIN No. 320. AUGUST, 1915**

# Meteorological Observations
AT THE
# MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.
*Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.*
*Height of Wind Instruments 72 ft.*

## MONTHLY SUMMARY.

### Pressure. In inches.

| | |
|---|---|
| Maximum reduced to freezing, | 29.98, 3d, 10 P. |
| Minimum reduced to freezing, | 29.40, 25th, 8 A. |
| Reduced[†] maximum reading, | 30.28, 3d, 10 P. |
| Reduced[†] minimum reading, | 29.69, 25th, 8 A. |
| Mean semi-daily reduced, | 29.978 |
| Monthly range, | 0.59 |

### [*]Air Temperature. In Degrees Fahr.

| | |
|---|---|
| Highest, | 88.0, 1st, 1 P., 13th, 4 P. |
| Lowest, | 42.0, 27th, 6 A. |
| Mean hourly, | 66.0 |
| Mean of means of max. and min., | 67.0 |
| Mean sensible (wet bulb), | 62.3 |
| Monthly range, | 46.0 |
| Highest mean daily, | 76.7, 1st |
| Lowest mean daily, | 55.6, 27th |
| Mean maximum, | 76.6 |
| Mean minimum, | 57.3 |
| Mean daily range, | 19.3 |
| Greatest daily range, | 29.5, 11th |
| Least daily range, | 7.0, 4th, 29th |

### Humidity.

| | |
|---|---|
| Mean dew point, | 60.4 |
| Mean force of vapor, | .635 |
| Mean relative humidity, | 85.0 |

### Precipitation. In inches.

| | |
|---|---|
| Total precipitation, | 8.28 |
| Number of days on which .01 inch or more rain fell | 14 |

### Wind.

| | |
|---|---|
| Total movement, | 3199m. |
| Greatest daily movement, | 250m., 26th |
| Least daily movement, | 41m., 20th |
| Mean daily movement, | 100m. |
| Mean hourly velocity, | 4.2 m. |

Maximum pressure per square foot, 9.5 lbs.= 44m. per hour, 8th, 2P., S.S.E.

Maximum velocity for 5 minutes, 42m. per hour, 4th, 2P., E.

Prevailing Direction, West Southwest.

### Summary.

| | |
|---|---|
| Northwest | 13 per cent. |
| South | 13 " " |
| West | 10 " " |
| Northeast | 10 " " |
| Other directions | 54 " " |

### Weather.

Mean cloudiness observed, 63 per cent.

Total cloudiness recorded by the Sun Thermometer, 277 hrs.=65 per cent.

| | |
|---|---|
| Number of clear days, | 0 |
| Number of fair days, | 16 |
| Number of cloudy days, | 15 |

### Bright Sunshine.

Number of hours recorded, 152 hrs.=35%.

**Rain,** 1st, 2d, 3d, 4th, 5th, 6th, 8th, 9th, 10th, 13th, 15th, 16th, 21st, 22d, 25th, 29th, 30th,

**Thunder and Lightning,** 1st, 9th, 15th, 22d.

**Hail,** 9th.

**Gales,** 35 or more miles per hour: 39m., 4th, E.; 44m., 8th, S.S.E.; 36m., 19th, N.N.W.

[*] Temperature in ground shelter.

[†] Reduced to freezing and sea-level.

# DAILY SUMMARY.

| Day. | Barometer Reduced to Sea Level. | | | Temperature. Ground Shelter. | | | | | | | No. Hours of Bright Sunshine. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Maximun. | Minimum. | Mean. Semi-daily. | Maximum | Time. | Minimum. | Time. | Mean of Max. and Min. | Mean Hourly Draper. | Mean Sensible Wet Bulb. | |
| 1 | 30.00 | 29.89 | 29.976 | 88.0 | 1 P | 69.0 | 6 A | 78.5 | 76.7 | 72.7 | 4.6 |
| 2 | 29.99 | 29.85 | 29.964 | 81.5 | 2:30 P | 70.0 | 7 A | 75.7 | 72.7 | 69.5 | 1.2 |
| 3 | 30.28 | 29.99 | 30.245 | 67.5 | 12 M | 54.5 | 12 P | 61.0 | 61.3 | 55.7 | 0.6 |
| 4 | 30.25 | 29.83 | 30.000 | 61.5 | 3 P | 54.5 | 0 A | 58.0 | 57.9 | 56.7 | 0.0 |
| 5 | 30.04 | 29.94 | 30.023 | 64.0 | 5 P | 55.0 | 3 A | 59.5 | 59.9 | 57.3 | 0.0 |
| 6 | 30.04 | 29.97 | 30.005 | 65.5 | 12 M | 57.0 | 2 A | 61.3 | 60.3 | 59.0 | 0.0 |
| 7 | 30.06 | 29.86 | 29.984 | 78.0 | 5 P | 56.0 | 3 A | 67.0 | 66.0 | 64.0 | 6.4 |
| 8 | 30.01 | 29.87 | 29.958 | 84.0 | 3:30 P | 62.5 | 5:30 A | 73.3 | 71.4 | 67.3 | 6.5 |
| 9 | 29.93 | 29.79 | 29.911 | 80.0 | 1 P | 62.5 | 12 P | 71.3 | 67.6 | 65.5 | 4.4 |
| 10 | 29.93 | 29.82 | 29.916 | 81.0 | 3 P | 57.5 | 5:30 A | 69.3 | 67.0 | 62.7 | 10.2 |
| 11 | 30.03 | 29.93 | 30.010 | 85.5 | 4 P | 56.0 | 5:30 A | 70.7 | 70.0 | 65.7 | 11.2 |
| 12 | 30.07 | 29.94 | 30.038 | 81.0 | 1 P | 66.0 | 6 A | 73.5 | 69.0 | 64.3 | 3.4 |
| 13 | 29.94 | 29.80 | 29.890 | 88.0 | 4 P | 66.0 | 6 A | 77.0 | 75.6 | 72.5 | 6.0 |
| 14 | 30.01 | 29.86 | 29.978 | 85.0 | 2 P | 64.0 | 6 A | 74.5 | 73.8 | 71.0 | 7.0 |
| 15 | 30.05 | 29.93 | 30.006 | 84.0 | 3 P | 61.0 | 5:30 A | 72.5 | 72.3 | 69.0 | 4.1 |
| 16 | 30.02 | 29.90 | 29.979 | 85.5 | 3 P | 66.0 | 3 A | 75.7 | 73.0 | 68.5 | 6.7 |
| 17 | 30.01 | 29.82 | 29.914 | 74.0 | 9 A | 51.0 | 12 P | 62.5 | 64.7 | 59.0 | 7.4 |
| 18 | 30.01 | 29.88 | 29.972 | 70.0 | 3 P | 47.0 | 5 A | 58.5 | 59.0 | 53.0 | 9.4 |
| 19 | 29.96 | 29.87 | 29.954 | 77.5 | 2 P | 49.0 | 4 A | 63.3 | 63.5 | 58.5 | 7.8 |
| 20 | 30.03 | 29.94 | 30.011 | 82.0 | 1 P | 51.0 | 5 A | 66.5 | 65.8 | 59.5 | 7.7 |
| 21 | 30.04 | 29.93 | 30.008 | 76.0 | 2 P | 55.5 | 6 A | 65.7 | 65.8 | 62.5 | 0.6 |
| 22 | 29.93 | 29.74 | 29.815 | 75.0 | 11 A | 66.0 | 5 A | 70.5 | 69.7 | 67.7 | 0.0 |
| 23 | 29.85 | 29.73 | 29.828 | 81.0 | 4 P | 65.0 | 12 P | 73.0 | 71.7 | 67.3 | 2.9 |
| 24 | 29.91 | 29.75 | 29.850 | 86.0 | 3 P | 58.0 | 5:30 A | 72.0 | 70.6 | 67.5 | 8.4 |
| 25 | 29.84 | 29.69 | 29.758 | 78.0 | 3 P | 58.0 | 12 P | 68.0 | 69.2 | 65.5 | 4.9 |
| 26 | 30.12 | 29.84 | 29.976 | 73.0 | 3 P | 52.0 | 6 A | 62.5 | 61.1 | 56.7 | 7.7 |
| 27 | 30.27 | 30.12 | 30.239 | 70.5 | 4 P | 42.0 | 6 A | 56.3 | 55.6 | 51.7 | 8.9 |
| 28 | 30.20 | 30.07 | 30.150 | 69.0 | 2 P | 44.0 | 6 A | 56.5 | 56.9 | 54.3 | 5.5 |
| 29 | 30.07 | 29.90 | 29.966 | 60.0 | 5 P | 53.0 | 5 A | 56.5 | 56.5 | 54.5 | 0.0 |
| 30 | 29.91 | 29.83 | 29.874 | 72.0 | 4 P | 56.5 | 0 A | 64.3 | 61.5 | 60.3 | 1.9 |
| 31 | 30.22 | 29.91 | 30.108 | 71.0 | 3 P | 52.0 | 12 P | 61.5 | 59.9 | 53.5 | 6.7 |

# DAILY SUMMARY.

| Day. | Humidity. | | | Wind. | | | | | Precipitation. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Mean Dew Point. | Mean Force vapor. | Mean Relative Humidity. | Prevailing Direction. | Total Movement in Miles. | Maximum Pressure Per Square Ft | Miles per Hour. | Time. | Beginning. | Ending. | Total in Inches. Rain.** | Total in Inches. Snow. |
| 1 | 71.5 | .879 | 89.0 | S.W. | 52 | 1.5 | 17 | 7 P | 9 P | 12 P | 1.53 | |
| 2 | 69.0 | .760 | 92.0 | W. | 89 | 1.5 | 17 | 10 P | 0 A | 7 A | .29 | |
| 3 | 53.0 | .508 | 81.5 | N.E. | 140 | 1.5 | 17 | 7 A | 10 A | 6 P | .35 | |
| 4 | 55.0 | .508 | 85 0 | N.E. | 159 | 7.5 | 39 | 2 P | 11 A | 11 P | 2.61 | |
| 5 | 55.5 | .516 | 85.0 | N.N.E. | 208 | 1.5 | 17 | 7 A | 10 P | | T | |
| 6 | 58.0 | .515 | 94.0 | N.E. | 119 | 0.5 | 10 | 12 M | 8 A | 10 P | .44 | |
| 7 | 62.5 | .644 | 88.5 | S. | 108 | 1.5 | 17 | 2 P | | | | |
| 8 | 64.0 | .783 | 77.0 | S.S.E. | 108 | 9.5 | 44 | 2 P | 8 P | 12 P | .01 | |
| 9 | 64.0 | .673 | 90.0 | S.E. | 101 | 2.0 | 20 | 2 P | 0 A | 10 P | .46 | |
| 10 | 60.5 | .643 | 82.5 | N.W. | 83 | 2.5 | 22 | 1 P | 12 M | | T | |
| 11 | 63.5 | .728 | 81 0 | S.W. | 62 | 0.5 | 10 | 10 A | | | | |
| 12 | 62.0 | .671 | 84.0 | S.E. | 100 | 1.0 | 14 | 1 P | 4 P | 12 P | .46 | |
| 13 | 71.0 | .877 | 88.0 | S. | 75 | 0.5 | 10 | 5 P | 0 A | 5 A | .20 | |
| 14 | 69.5 | .852 | 84.5 | W. | 78 | 0.5 | 10 | 2 P | | | | |
| 15 | 67 5 | .781 | 87.0 | S.S.W. | 73 | 1 0 | 14 | 3 P | 3 P | 8 P | .01 | |
| 16 | 67 5 | .753 | 88.0 | W.S.W. | 87 | 0.5 | 10 | 2 P | 5 P | | T | |
| 17 | 56 0 | .578 | 78.5 | N. | 192 | 5.0 | 32 | 11 A | | | | |
| 18 | 48.0 | .492 | 69.5 | N.N.W. | 167 | 6.5 | 36 | 1 P | | | | |
| 19 | 55.0 | .594 | 72.0 | W.N.W. | 65 | 0.5 | 10 | 2 P | | | | |
| 20 | 60.0 | .568 | 88.0 | S.S.W. | 41 | 0.0 | — | — | | | | |
| 21 | 61.5 | .604 | 91 0 | S. | 48 | 1.0 | 14 | 10 P | 6 P | | T | |
| 22 | 66.5 | .732 | 89.5 | S.S.E. | 250 | 3.5 | 26 | 10 A | 1 A | 9 P | 1.13 | |
| 23 | 66.0 | .707 | 91.5 | W.S.W. | 106 | 0.5 | 10 | 2 P | | | | |
| 24 | 66.5 | .718 | 91 5 | S. | 44 | 0.5 | 10 | 11 P | | | | |
| 25 | 64.5 | .666 | 91.0 | N.W. | 144 | 3.0 | 24 | 5 P | 1 A | 7 P | .29 | |
| 26 | 53.0 | .535 | 77.0 | N.W. | 144 | 3.0 | 24 | 3 P | | | | |
| 27 | 47.5 | .446 | 78.0 | W.N.W. | 55 | 0.0 | — | — | | | | |
| 28 | 52.5 | .464 | 84.0 | E. | 57 | 0.5 | 10 | 9 P | | | | |
| 29 | 53.5 | .450 | 89.5 | N. | 77 | 0.0 | — | — | 4 A | 12 P | .14 | |
| 30 | 59.0 | .540 | 94.5 | W. | 56 | 0.0 | — | — | 0 A | 1 P | .36 | |
| 31 | 50.0 | .496 | 72.0 | N.W. | 111 | 1.5 | 17 | 9 A | | | | |

**Rain or meltedsnow at base of tower. *Included in following day.

# REMARKS

The general character of the weather during the month was similar in many respects to the abnormal record of July. An excessive rainfall, high humidity and much cloudiness were the predominating features. While the precipitation was slightly less than that of July, it was larger than any previous record for August since this station was established. The amount of cloudiness was considerably greater than in the preceding month and the relative humidity several points higher. The two months taken together furnish a very exceptional record for heavy rainfall.

Comparing the records of the several weather elements with the corresponding normals for this station the following features are noted : The mean barometer was slightly lower than the normal and the range of pressure comparatively small. Changes in pressure were generally slow and small. The total wind movement was practically normal and few gales were recorded. Daily wind directions were much more variable than usual.

The mean temperature was nearly two degrees lower than usual and the range slightly smaller than usual. The maximum temperature was comparatively low and one of the dates was the first, the day following the maximum of the month before, which was reached the last day of July. Although frost was feared several times the minimum temperature did not fall below 42 degrees, which is at least six degrees above the record at which frost might be noted in especially exposed places at the level of the ground.

The mean dew point was practically normal, while the mean relative humidity was exceptionally high.

The total precipitation was nearly twice the normal amount. More than one-half the total fell during the heavy storms on the first four days of the month.

Nearly an equal number of cloudy and fair days were noted, while not a single day was rated as clear.

J. E. OSTRANDER, Meteorologist.

DAVID POTTER, Observer.

## BULLETIN NO. 321. SEPTEMBER, 1915

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Agricultural College

# Meteorological Observations
AT THE
# MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.
*Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.*
*Height of Wind Instruments 72 ft.*

## MONTHLY SUMMARY.

### Pressure. In inches.

| | |
|---|---|
| Maximum reduced to freezing | 30.09, 1st, 9 A.; 2d, 8 A. |
| Minimum reduced to freezing | 29.05, 26th, 6 P |
| Reduced† maximum reading | 30.37, 1st, 9 A; 2d, 8 A. |
| Reduced† minimum reading | 29.34, 26th, 6 P |
| Mean semi-daily reduced | 30.050 |
| Monthly range | 1.03 |

### *Air Temperature. In Degrees Fahr.

| | |
|---|---|
| Highest | 93.0, 9th, 4 P; 15th, 1:30 P |
| Lowest | 34.5, 30th, 5:30 A |
| Mean hourly | 64.2 |
| Mean of means of max. and min. | 66.0 |
| Mean sensible (wet bulb) | 59.3 |
| Monthly range | 58.5 |
| Highest mean daily | 79.4, 15th |
| Lowest mean daily | 48.6, 28th |
| Mean maximum | 78.1 |
| Mean minimum | 53.9 |
| Mean daily range | 24.2 |
| Greatest daily range | 36.0, 30th |
| Least daily range | 13.5, 6th |

### Humidity.

| | |
|---|---|
| Mean dew point | 56.3 |
| Mean force of vapor | .601 |
| Mean relative humidity | 80.8 |

### Precipitation. In inches.

| | |
|---|---|
| Total precipitation | 1.37 |
| Number of days on which .01 inch or more rain fell | 7 |

### Wind.

| | |
|---|---|
| Total movement | 3332 m |
| Greatest daily movement | 373m, 27th |
| Least daily movement | 15 m, 2d |
| Mean daily movement | 111 m |
| Mean hourly velocity | 4.6 m |

Maximum pressure per square foot, = 54 m per hour, 26th, 11 P, W.
Maximum velocity for 5 minutes, 48 m per hour, 26th, 7 P, W.
Prevailing direction, Southwest.

Summary.

| | |
|---|---|
| South | 40 per cent |
| Northwest | 17 " " |
| West | 10 " " |
| Other directions | 33 " " |

### Weather.

| | |
|---|---|
| Mean cloudiness observed | 53 per cent |
| Total cloudiness recorded by the Sun Thermometer | 192 hours = 51 per cent |
| Number of clear days | 4 |
| Number of fair days | 16 |
| Number of cloudy days | 10 |

### Bright Sunshine.

Number hours recorded, 181 hrs, = 49 per cent

**Rain,** 7th, 13th, 14th, 16th, 17th, 19th, 21st, 24th, 26th.

**Thunder and Lightning,** 13th, 16th, 17th, 21st.

**Frosts,** 23d.

**Gales,** 35 or more miles per hour: 35m, 21st, W.N.W.; 54m, 26th, W.; 39m, 27th, W.

---

* Temperature in ground shelter.

† Reduced to freezing and sea-level.

# DAILY SUMMARY.

| Day. | Barometer Reduced to Sea Level. | | | Temperature. Ground Shelter. | | | | | | | No. Hours of Bright Sunshine. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Maximun. | Minimum. | Mean. Semi-daily. | Maximum | Time. | Minimum. | Time. | Mean of Max. and Min. | Mean Hourly Draper. | Mean Sensible Wet Bulb. | |
| 1 | 30.37 | 30.21 | 30.362 | 74 0 | 3 P | 44.5 | 6 A | 59 7 | 58.2 | 53.0 | 8.2 |
| 2 | 30.37 | 30.18 | 30.275 | 80.5 | 3:30 P | 47.0 | 6 A | 63 7 | 60.9 | 55.7 | 3.3 |
| 3 | 30.20 | 30.08 | 30.144 | 87.0 | 2:30 P | 53.0 | 5 A | 70.0 | 67.4 | 62.0 | 5.0 |
| 4 | 30.08 | 29.95 | 30.030 | 88.0 | 2 P | 57.0 | 6 A | 72.5 | 69 7 | 64.5 | 4.9 |
| 5 | 30.10 | 30.00 | 30.094 | 84.0 | 3 P | 62.5 | 6 A | 73.3 | 71.0 | 65.7 | 5.5 |
| 6 | 30.12 | 30.04 | 30.159 | 77.0 | 3:30 P | 63.5 | 6 A | 70.3 | 68.4 | 62.7 | 4 6 |
| 7 | 30.07 | 29 92 | 30.061 | 80.5 | 4 P | 63 0 | 6 A | 71.7 | 69.0 | 66.3 | 3.5 |
| 8 | 30.03 | 29 86 | 29.966 | 85.0 | 3 P | 69 0 | 5 A | 77.0 | 73.1 | 70.5 | 5.4 |
| 9 | 29.93 | 29.79 | 29 884 | 93.0 | 4 P | 69.0 | 5 A | 81 0 | 76.4 | 70.7 | 7.0 |
| 10 | 29.95 | 29 87 | 29.908 | 87.0 | 3 P | 63.5 | 7 A | 75.3 | 74.2 | 68.5 | 9.5 |
| 11 | 29.98 | 29 87 | 29.943 | 87.5 | 3 P | 56.0 | 7 A | 71.7 | 70.7 | 66.7 | 6.8 |
| 12 | 30.10 | 29.98 | 30.066 | 82 0 | 4 P | 55.5 | 6 A | 68.7 | 67.4 | 62.0 | 8.5 |
| 13 | 30.18 | 30.02 | 30.119 | 80.0 | 3:30 P | 62.0 | 12 P | 71.0 | 67.8 | 64.3 | 1.4 |
| 14 | 30.18 | 30.07 | 30.108 | 92.0 | 3 P | 60.0 | 1 A | 76.0 | 74.8 | 72.7 | 7.1 |
| 15 | 30.21 | 30.11 | 30.146 | 93.0 | 1:30 P | 70.0 | 3 A | 81.5 | 79.4 | 75.3 | 7.9 |
| 16 | 30.23 | 30.11 | 30.189 | 91.0 | 3 P | 71.0 | 6 A | 81.0 | 78.1 | 71.5 | 6 7 |
| 17 | 30.11 | 29.95 | 30 064 | 86.0 | 1 P | 66.5 | 5 A | 76.3 | 73.9 | 69.0 | 5.0 |
| 18 | 30.16 | 30.00 | 30.079 | 76.0 | 4 P | 60.5 | 5:30 A | 68.3 | 67.2 | 62.3 | 8.1 |
| 19 | 30.00 | 29.84 | 29.896 | 78.0 | 4 P | 58.0 | 5 A | 68.0 | 63.8 | 60.5 | 0.4 |
| 20 | 29.97 | 29 83 | 29.932 | 80.0 | 2:30 P | 53.0 | 6 A | 66.5 | 64.9 | 60.5 | 6.4 |
| 21 | 29.83 | 29 52 | 29.701 | 68.0 | 9 A | 52.0 | 12 P | 60.0 | 62.6 | 57.0 | 0.0 |
| 22 | 30.26 | 29 79 | 30.124 | 62.0 | 3:30 P | 41.5 | 12 P | 51 7 | 52.0 | 44.7 | 7 4 |
| 23 | 30.34 | 30.18 | 30 279 | 69.0 | 3 P | 35 0 | 5:30 A | 52 0 | 51.5 | 45 5 | 6.0 |
| 24 | 30.23 | 30 12 | 30.186 | 66.5 | 4:30 P | 45 0 | 4 A | 55.7 | 52.1 | 49.7 | 3.0 |
| 25 | 30.34 | 30.12 | 30 280 | 70 0 | 4:30 P | 42.0 | 6 A | 56 0 | 55.0 | 50 0 | 9.8 |
| 26 | 30.12 | 29.34 | 29.664 | 68.0 | 6:30 P | 44.0 | 1 A | 56.0 | 55.9 | 53.3 | 0.0 |
| 27 | 29.87 | 29 55 | 29 820 | 59 5 | 3 P | 42.0 | 12 P | 50.7 | 49.5 | 42.3 | 8.3 |
| 28 | 29.90 | 29.78 | 29.874 | 62.5 | 2:30 P | 36 0 | 5:30 A | 49 3 | 48.6 | 42 5 | 10.6 |
| 29 | 30.12 | 29.90 | 29.987 | 66.0 | 2;30 P | 40.5 | 5 A | 53.3 | 52.1 | 44.3 | 10.7 |
| 30 | 30.22 | 30 08 | 30.162 | 70.5 | 3 P | 34.5 | 5:30 A | 52.5 | 50.0 | 44.5 | 10.4 |

# DAILY SUMMARY.

| Day. | Humidity. | | | Wind. | | | | | Precipitation. | | Total in Inches. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Mean Dew Point. | Mean Force vapor. | Mean Relative Humidity. | Prevailing Direction. | Total Movement in Miles. | Maximum Pressure Per Square Ft | Miles per Hour. | Time. | Beginning. | Ending. | Rain.** | Snow. |
| 1 | 50.0 | .456 | 81.0 | N.N.E. | 85 | 0.0 | — | | | | | |
| 2 | 53.0 | .479 | 87.0 | S.W. | 15 | 0.0 | — | | | | | |
| 3 | 61.0 | .612 | 88.5 | W. | 32 | 0.0 | — | | | | | |
| 4 | 63.0 | .679 | 85 5 | W. | 38 | 0.0 | — | | | | | |
| 5 | 62.0 | .788 | 71.0 | N.W. | 43 | 0.0 | — | | | | | |
| 6 | 60.0 | .659 | 79.0 | S. | 68 | 0.0 | — | | | | | |
| 7 | 61.0 | .691 | 78.0 | S. | 70 | 1.5 | 17 | 5 P | 4 A | 8 A | T | |
| 8 | 69.5 | .806 | 89 5 | S. | 128 | 2.0 | 20 | 5 P | | | | |
| 9 | 69.0 | .831 | 87.5 | S.W. | 72 | 0.5 | 10 | 3 A | | | | |
| 10 | 66.5 | .813 | 79.5 | W.N.W. | 111 | 2.0 | 20 | 4 P | | | | |
| 11 | 65.0 | .752 | 82.0 | W. | 52 | 1.0 | 14 | 4 P | | | | |
| 12 | 59.0 | .646 | 79.0 | S. | 63 | 0.5 | 10 | 10 P | | | | |
| 13 | 63.0 | .649 | 88.5 | S.E. | 81 | 0.0 | — | — | 7 A | 5 P | .08 | |
| 14 | 72.0 | .873 | 90.0 | S. | 150 | 2.5 | 22 | 1 A | 1 A | 2 A | .04 | |
| 15 | 74 5 | .913 | 93.5 | S.S.E. | 131 | 1 0 | 14 | 2 P | | | | |
| 16 | 70.0 | .838 | 89.0 | S.S.E. | 88 | 1.5 | 17 | 6 P | 4 P | 7 P | T | |
| 17 | 67 5 | .894 | 84 0 | S. | 117 | 2.0 | 20 | 12 M | 3 P | 4 P | .04 | |
| 18 | 60.0 | .644 | 80.0 | S. | 68 | 0.5 | 10 | 8 P | | | | |
| 19 | 59.0 | .560 | 90.5 | S. | 48 | 0.0 | — | — | 2 A | 8 P | .08 | |
| 20 | 59.5 | .558 | 92.5 | S. | 124 | 1.0 | 14 | 12 P | | | | |
| 21 | 52.5 | .557 | 74.0 | S. | 166 | 6.0 | 35 | 10 P | 8 A | 3 P | .94 | |
| 22 | 38.0 | .364 | 64.5 | N.W. | 254 | 4.5 | 30 | 8 A | | | | |
| 23 | 41.0 | .352 | 72.5 | S. | 152 | 2.0 | 20 | 1 P | | | | |
| 24 | 48.0 | .380 | 90 5 | S. | 31 | 0.5 | 10 | 3 P | 7 A | 12 M | .02 | |
| 25 | 46.5 | .408 | 78.5 | S. | 50 | 5.0 | 32 | 7 P | | | | |
| 26 | 49 5 | .480 | 74.0 | W. | 296 | 14.5 | 54 | 11 P | 8 A | 5 P | .17 | |
| 27 | 36 0 | .324 | 66.5 | N.W. | 373 | 7.5 | 39 | 2 A | | | | |
| 28 | 34.5 | .334 | 62.0 | N.W. | 86 | 5.0 | 32 | 4 P | | | | |
| 29 | 37.5 | .358 | 63.0 | N.N.E. | 257 | 3.0 | 24 | 1 A | | | | |
| 30 | 41.5 | .321 | 82.5 | N. | 33 | 1.0 | 14 | 12 M | | | | |

**Rain or melted snow at base of tower. *Included in following day.

## REMARKS

The weather during September was considerably warmer than usual, due largely to a number of extremely warm days about the middle of the month. The highest temperature of the year was registered on the 15th, during a period of high humidity, and caused an unusually large number of prostrations from heat. The last part of the month, while seasonable, was rather cool. The precipitation was small, but owing to the extremely heavy rainfall of the preceding two months vegetation did not suffer.

The mean barometer was slightly below the normal and the range considerably more than usual owing to a minimum considerably lower than usual. The large number of days with wind from the South was exceptional for this station. While the total wind movement was nearly normal, several days near the close of the month showed a large daily record.

The mean hourly temperature was more than three degrees higher than the normal, and the mean of means of maximum and minimum records was nearly two degrees higher than the mean hourly records —an exceptionally large difference.

The maximum temperature was about six degrees higher than the September normal for this feature, and two degrees more than the previous maximum for this year. The minimum was slightly higher than usual, giving a large range for the month. Light frosts were noted near the end of the month, but no damage of consequence was done.

The mean dew point and relative humidity were both much higher than their respective normals.

The total precipitation was about one-third of the normal, and much the greater part was registered during a single storm.

The amount of sunshine was slightly less than the normal.

J. E. OSTRANDER, Meteorologist.

DAVID POTTER, Observer.

BULLETIN No. 322. OCTOBER, 1915

# Meteorological Observations
AT THE
# MASSACHUSETTS
# AGRICULTURAL EXPERIMENT
# STATION.

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Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.
*Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.*
*Height of Wind Instruments 72 ft.*

## MONTHLY SUMMARY.

### **Pressure.** In inches.

| | |
|---|---|
| Maximum reduced to freezing | 30.11, 16th, 6 A. |
| Minimum reduced to freezing | 29.28, 30th, 2 P |
| Reduced† maximum reading | 30.41, 11th, 9 A; 16th, 6 A. |
| Reduced† minimum reading | 29.58, 30th, 2 P |
| Mean semi-daily reduced | 30.082 |
| Monthly range | 0.83 |

### ***Air Temperature.** In Degrees Fahr.

| | |
|---|---|
| Highest | 76.0, 13th, 14th, 15th, 17th |
| Lowest | 25.5, 25th |
| Mean hourly | 51.7 |
| Mean of means of max. and min. | 52.4 |
| Mean sensible (wet bulb) | 47.2 |
| Monthly range | 50.5 |
| Highest mean daily | 64.0, 15th |
| Lowest mean daily | 39.6, 23d |
| Mean maximum | 63.1 |
| Mean minimum | 41.8 |
| Mean daily range | 21.3 |
| Greatest daily range | 39.0, 17th |
| Least daily range | 4.5, 2d |

### **Humidity.**

| | |
|---|---|
| Mean dew point | 44.2 |
| Mean force of vapor | .371 |
| Mean relative humidity | 81.6 |

### **Precipitation.** In inches.

| | |
|---|---|
| Total precipitation | 2.89 |
| Number of days on which .01 inch or more rain fell | 7 |

### **Wind.**

| | |
|---|---|
| Total movement | 3786 m |
| Greatest daily movement | 315m, 30th |
| Least daily movement | 15 m, 1st |
| Mean daily movement | 122 m |
| Mean hourly velocity | 5.1 m |

Maximum pressure per square foot, 12.0 lbs = 49 m per hour, 30th, 1 P, N.W.

Maximum velocity for 5 minutes, 30m per hour, 30th, 4 P, N.W.

Prevailing direction, West.

Summary.

| | |
|---|---|
| South Southwest | 26 per cent |
| West | 19 " " |
| North Northwest | 16 " " |
| Northwest | 10 " " |
| West Northwest | 10 " " |
| Other directions | 19 " " |

### **Weather.**

| | |
|---|---|
| Mean cloudiness observed | 44 per cent |
| Total cloudiness recorded by the Sun Thermometer | 179 hours = 52 per cent |
| Number of clear days | 6 |
| Number of fair days | 12 |
| Number of cloudy days | 13 |

### **Bright Sunshine.**

Number hours recorded, 162 hrs, =48 per cent,

**Rain,** 1st, 2d, 5th, 7th, 8th, 15th, 20th, 26th.

**Thunder and Lightning,** 26th.

**Frosts,** 9th. 11th, 25th, 28th.

**Gales,** 35 or more miles per hour: 36m, 22d, W.N.W.; 35m, 23d, N.W.; 49m, 30th, N.W.

---

* Temperature in ground shelter.

† Reduced to freezing and sea-level.

# DAILY SUMMARY.

| Day. | Barometer Reduced to Sea Level. | | | Temperature. Ground Shelter. | | | | | | | | No. Hours of Bright Sunshine |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Maximun. | Minimum. | Mean. Semi-daily. | Maximum | Time. | Minimum. | Time. | Mean of Max. and Min. | Mean Hourly Draper. | Mean Sensible Wet Bulb. | |
| 1 | 30.15 | 29.94 | 30.074 | 60.5 | 4 P | 37.0 | 7:30 A | 48.7 | 49.4 | 45.3 | 3.0 |
| 2 | 29.94 | 29.78 | 29.844 | 49.0 | 1 A | 44.5 | 12 P | 47.3 | 47.6 | 46.5 | 0.0 |
| 3 | 30.08 | 29.88 | 30.004 | 54.0 | 12 M | 38.0 | 12 P | 46.0 | 47.5 | 46.7 | 0.3 |
| 4 | 30.21 | 30.03 | 30.151 | 67.5 | 4 P | 34.5 | 2 A | 51.0 | 51.0 | 46.0 | 9.4 |
| 5 | 30.03 | 29.73 | 29.879 | 66.0 | 1:30 P | 51.0 | 12 P | 58.5 | 58.0 | 56.3 | 0.2 |
| 6 | 30.11 | 29.92 | 30.057 | 61.5 | 4:30 P | 42.5 | 12 P | 52.0 | 51.0 | 46.7 | 1.4 |
| 7 | 30.21 | 30.05 | 30.174 | 61.5 | 1 P | 38.0 | 3 A | 49.7 | 50.0 | 47.0 | 2.8 |
| 8 | 30.05 | 29.94 | 29.975 | 59.0 | 4 P | 46.5 | 6 A | 52.7 | 51.0 | 47.5 | 3.4 |
| 9 | 30.08 | 29.94 | 30.030 | 58.0 | 2 P | 39.0 | 7 A | 48.5 | 47.1 | 39.7 | 6.5 |
| 10 | 30.33 | 29.94 | 30.242 | 59.0 | 3 P | 37.0 | 6:30 A | 48.0 | 46.0 | 40.3 | 9.4 |
| 11 | 30.41 | 30.25 | 30.353 | 61.0 | 3 P | 28.0 | 7 A | 44.5 | 45.0 | 39.7 | 9.4 |
| 12 | 30.34 | 30.22 | 30.300 | 73.0 | 3 P | 43.5 | 6:30 A | 58.3 | 56.0 | 49.5 | 8.7 |
| 13 | 30.39 | 30.28 | 30.369 | 76.0 | 2 P | 49.0 | 5 A | 62.5 | 59.0 | 52.5 | 7.6 |
| 14 | 30.34 | 30.20 | 30.302 | 76.0 | 1:30 P | 54.0 | 5 A | 65.0 | 63.1 | 58.3 | 5.1 |
| 15 | 30.31 | 30.18 | 30.299 | 76.0 | 3 P | 56.0 | 12 P | 66.0 | 64.0 | 57.3 | 1.5 |
| 16 | 30.41 | 30.24 | 30.231 | 65.0 | 3 P | 46.5 | 12 P | 55.7 | 55.8 | 50.3 | 7.2 |
| 17 | 30.24 | 30.09 | 30.192 | 76.0 | 3 P | 37.0 | 6 A | 56.5 | 52.8 | 43.0 | 7.8 |
| 18 | 30.24 | 30.10 | 30.185 | 70.0 | 3 P | 42.0 | 6:30 A | 56.0 | 55.1 | 50.3 | 8.2 |
| 19 | 30.12 | 29.98 | 30.059 | 67.0 | 4 P | 51.0 | 0 A | 59.0 | 59.4 | 57.3 | 0.6 |
| 20 | 30.03 | 29.95 | 30.010 | 64.0 | 2 P | 59.0 | 7 A | 61.5 | 61.0 | 59.7 | 0.0 |
| 21 | 29.98 | 29.79 | 29.942 | 74.0 | 1:30 P | 48.0 | 11:30 P | 61.0 | 61.2 | 55.7 | 5.9 |
| 22 | 29.99 | 29.81 | 29.924 | 59.0 | 2 P | 42.0 | 5 A | 50.5 | 50.9 | 49.5 | 8.0 |
| 23 | 29.92 | 29.86 | 29.910 | 45.0 | 1 P | 34.0 | 6 A | 39.5 | 39.6 | 34.7 | 7.2 |
| 24 | 30.15 | 29.90 | 30.019 | 53.0 | 2:30 P | 33.0 | 12 P | 43.0 | 40.4 | 37.3 | 7.3 |
| 25 | 30.27 | 30.15 | 30.250 | 56.0 | 3 P | 25.5 | 6 A | 40.7 | 39.9 | 35.0 | 8.9 |
| 26 | 30.23 | 30.07 | 30.169 | 63.5 | 12 M | 39.0 | 0 A | 51.3 | 52.2 | 51.7 | 3.6 |
| 27 | 30.18 | 30.04 | 30.153 | 67.0 | 3 P | 41.0 | 12 P | 54.0 | 54.1 | 49.3 | 6.7 |
| 28 | 30.19 | 29.99 | 30.091 | 62.0 | 3 P | 31.5 | 6:30 A | 46.7 | 45.7 | 38.0 | 8.9 |
| 29 | 30.00 | 29.66 | 29.798 | 62.0 | 3:30 P | 43.0 | 0 A | 52.5 | 52.7 | 49.7 | 1.9 |
| 30 | 29.79 | 29.58 | 29.653 | 54.5 | 3 P | 45.0 | 10 P | 49.7 | 48.9 | 42.0 | 2.3 |
| 31 | 29.74 | 29.79 | 29.898 | 59.0 | 2 P | 41.0 | 7 A | 50.0 | 48.4 | 41.7 | 8.7 |

# DAILY SUMMARY.

| Day. | Humidity. | | | Wind. | | | | | Precipitation. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Mean Dew Point. | Mean Force vapor. | Mean Relative Humidity. | Prevailing Direction. | Total Movement in Miles. | Maximum Pressure Per Square Ft | Miles per Hour. | Time. | Beginning. | Ending. | Total in Inches. | |
| | | | | | | | | | | | Rain.** | Snow. |
| 1 | 42.0 | .343 | 78.5 | N.W. | 15 | 0.0 | — | — | 11 P | 12 P | .03 | |
| 2 | 45.5 | .322 | 96.0 | N.N.E. | 145 | 1.5 | 17 | 5 P | 0 A | 8 P | .49 | |
| 3 | 45.0 | .336 | 91.0 | N.N.W. | 42 | 0.0 | — | — | | | | |
| 4 | 43.0 | .349 | 81.5 | S.W. | 53 | 1.5 | 17 | 7 P | | | | |
| 5 | 54.5 | .486 | 88.5 | S. | 203 | 4.5 | 30 | 10 A | 7 A | 5 P | .25 | |
| 6 | 45.0 | .338 | 90.0 | N. | 48 | 0.5 | 10 | 1 P | | | | |
| 7 | 45.5 | .341 | 89.5 | S. | 52 | 1.5 | 17 | 10 A | 6 P | 12 P | T | |
| 8 | 45.5 | .353 | 87.0 | W. | 40 | 0.0 | — | — | 0 A | 7 A | .88 | |
| 9 | 33.5 | .286 | 67.5 | N.N.W. | 49 | 1.5 | 17 | 2 P | | | | |
| 10 | 37.0 | .273 | 80.5 | N.N.W. | 71 | 2.0 | 20 | 2 P | | | | |
| 11 | 36.5 | .279 | 81.0 | S.S.W. | 82 | 2.0 | 20 | 5 P | | | | |
| 12 | 47.0 | .396 | 82.0 | S.S.W. | 171 | 2.0 | 20 | 2 P | | | | |
| 13 | 49.5 | .458 | 79.0 | S.S.W- | 153 | 3.0 | 24 | 5 P | | | | |
| 14 | 56.5 | .541 | 86.0 | S.S.W. | 175 | 3.0 | 24 | 1 P | | | | |
| 15 | 55.5 | .519 | 86.5 | N. | 118 | 1.0 | 14 | 2 P | 7 A | 8 P | .52 | |
| 16 | 46.0 | .431 | 72.5 | W. | 51 | 0.0 | — | — | | | | |
| 17 | 36.5 | .342 | 64.5 | W. | 33 | 0.5 | 10 | 4 P | | | | |
| 18 | 49.0 | .396 | 88.0 | W.N.W. | 52 | 1.0 | 14 | 6 P | | | | |
| 19 | 55.0 | .525 | 83.5 | S.S.W. | 166 | 2.5 | 22 | 1 P | | | | |
| 20 | 59.0 | .526 | 95.5 | S.S.W. | 31 | 0.0 | — | — | 5 A | 12 P | .57 | |
| 21 | 54.5 | .470 | 91.5 | W. | 91 | 3.5 | 26 | 6 P | | | | |
| 22 | 47.0 | .385 | 85.5 | W.N.W. | 212 | 6.5 | 36 | 10 A | | | | |
| 23 | 26.5 | .236 | 60.5 | N.N.W. | 282 | 6.0 | 35 | 1 P | | | | |
| 24 | 33.0 | .241 | 79.0 | N.N.W. | 112 | 2.5 | 22 | 1 P | | | | |
| 25 | 31.5 | .229 | 78.5 | W. | 40 | 0.0 | — | — | | | | |
| 26 | 50.0 | .423 | 85.5 | S.S.W. | 258 | 4.5 | 30 | 12 M | 8 P | 12 P | .15 | |
| 27 | 47.0 | .379 | 87.0 | W.N.W. | 202 | 3.0 | 24 | 4 P | | | | |
| 28 | 33.5 | .263 | 74.5 | W. | 55 | 0.5 | 19 | 2 P | | | | |
| 29 | 47.5 | .399 | 82.5 | S.S.W. | 212 | 3.0 | 24 | 5 A | | | | |
| 30 | 35.0 | .325 | 63.5 | N.W. | 315 | 12.0 | 49 | 1 P | | | | |
| 31 | 37.5 | .302 | 73.0 | N.W. | 257 | 3.0 | 24 | 11 A | | | | |

**Rain or meltedsnow at base of tower. *Included in following day.

## REMARKS

The weather during October was generally seasonable and unmarked by abnormal features. Many fair days and mild temperature combined to make it one of the most pleasant periods of the year. The precipitation was somewhat deficient for the month and the temperature slightly above the normal.

The barometer was rather inactive for the time of year, the range being only about three-fourths of the normal value. The mean pressure was a few hundredths above the normal. The total wind movement was about 500 miles less than usual, and only three days showed gales of moderate intensity. The prevailing wind direction was almost due West, and the eastern points of the compass were hardly noted in the record of wind direction.

The mean hourly temperature was between one and two degrees higher than the normal, and the maximum was three degrees lower than usual, while the minimum was slightly higher than the normal, giving a considerably smaller range than the normal value for this feature.

The mean dew point was comparatively high, and the relative humidity more than six points above the normal.

The total precipitation was about 80 per cent of the usual amount, and most of it occurred during a few well-defined storms of moderate intensity. The last part of the month was comparatively free from rain.

The amount of sunshine was a little less than the normal value.

J. E. OSTRANDER, Meteorologist.

DAVID POTTER, Observer.

BULLETIN No. 323. NOVEMBER, 1915

# Meteorological Observations
AT THE
# MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.
*Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.*
*Height of Wind Instruments 72 ft.*

## MONTHLY SUMMARY.

**Pressure.** In inches.

| | |
|---|---|
| Maximum reduced to freezing | 30.16, 18th, 7 A. |
| Minimum reduced to freezing | 28.89, 19th, 8 P |
| Reduced† maximum reading | 30.48, 18th, 7 A |
| Reduced† minimum reading | 29.19, 19th, 8 P |
| Mean semi-daily reduced | 29.993 |
| Monthly range | 1.29 |

***Air Temperature.** In Degrees Fahr.

| | |
|---|---|
| Highest | 69 0, 1st |
| Lowest | 20.0, 18th |
| Mean hourly | 39.9 |
| Mean of means of max. and min. | 40.8 |
| Mean sensible (wet bulb) | 35.5 |
| Monthly range | 49.0 |
| Highest mean daily | 49.5, 12th |
| Lowest mean daily | 31.9, 18th |
| Mean maximum | 49.8 |
| Mean minimum | 31.7 |
| Mean daily range | 18.1 |
| Greatest daily range | 34.0, 8th |
| Least daily range | 4.0, 5th |

**Humidity.**

| | |
|---|---|
| Mean dew point | 30.7 |
| Mean force of vapor | .241 |
| Mean relative humidity | 74.7 |

**Precipitation.** In inches.

| | |
|---|---|
| Total precipitation | 2.20 |
| Number of days on which .01 inch or more rain fell | 9 |
| Total snow in inches | 0.5 |

**Wind.**

| | |
|---|---|
| Total movement | 5402 m |
| Greatest daily movement | 476m, 16th |
| Least daily movement | 6m, 26th |
| Mean daily movement | 180 m |
| Mean hourly velocity | 7.5 m |

Maximum pressure per square foot, 22.0 lbs = 66 m per hour, 15th, 8 P, W.N.W.
Maximum velocity for 5 minutes, 48m per hour, 15th, 9 P, W.N.W.
Prevailing direction, West Northwest.

Summary.

| | |
|---|---|
| North | 17 per cent |
| North Northeast | 13 " " |
| Southwest | 13 " " |
| West | 13 " " |
| West Northwest | 13 " " |
| South | 10 " " |
| Northwest | 10 " " |
| Other directions | 11 " " |

**Weather.**

| | |
|---|---|
| Mean cloudiness observed | 44 per cent |
| Total cloudiness recorded by the Sun Thermometer | 175 hours = 60 per cent |
| Number of clear days | 3 |
| Number of fair days | 13 |
| Number of cloudy days | 14 |

**Bright Sunshine.**

Number hours recorded, 118 hrs, = 40 per cent.

**Rain,** 2d, 4th, 12th, 14th, 15th, 19th, 21st, 27th, 29th.

**Thunder and Lightning,** 2d.

**Snow,** 17th, 23d.

**Gales,** 35 or more miles per hour: 56m, 2d, W. N. W.; 39m, 3d, N.W.; 44m, 9th, N.W.; 37m, 10th, N.W.; 56m, 13th, W.N.W.; 66m, 15th, W.N.W.: 51m, 16th, W.N.W.; 36m, 20th, N.W.

* Temperature in ground shelter.

† Reduced to freezing and sea-level.

# DAILY SUMMARY.

| Day. | Barometer Reduced to Sea Level. | | | Temperature. Ground Shelter. | | | | | | | No. Hours of Bright Sunshine. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Maximun. | Minimum. | Mean. Semi-daily. | Maximum | Time. | Minimum. | Time. | Mean of Max. and Min. | Mean Hourly Draper. | Mean Sensible Wet Bulb. | |
| 1 | 29.83 | 29.54 | 29.644 | 69 0 | 2 P | 45.0 | 0 A | 57.0 | 56.2 | 50.5 | 4.8 |
| 2 | 29.80 | 29.47 | 29.639 | 58.0 | 9 A | 43.0 | 12 P | 50.5 | 49.4 | 45.7 | 3.1 |
| 3 | 30.14 | 29.80 | 30.004 | 60.0 | 3 P | 37.0 | 12 P | 48.5 | 42.5 | 37.7 | 3.9 |
| 4 | 30.16 | 29.85 | 30.074 | 58.0 | 1 P | 27.0 | 6:30 A | 42.5 | 38.2 | 33.5 | 5.3 |
| 5 | 30.08 | 29.75 | 29.939 | 42.0 | 4 P | 38.0 | 11 A | 40.0 | 40.2 | 37.7 | 0 0 |
| 6 | 30.25 | 30.08 | 30.188 | 50.0 | 3 P | 32 0 | 12 P | 41.0 | 41.5 | 35.5 | 7.3 |
| 7 | 30.23 | 30.10 | 30.196 | 54.5 | 3 P | 27.0 | 7 A | 40.7 | 39.9 | 34.5 | 8.5 |
| 8 | 30 22 | 29.98 | 30 124 | 61.0 | 3 P | 27.0 | 6 A | 44.0 | 43.6 | 39 3 | 8.3 |
| 9 | 30.05 | 29.87 | 29 998 | 59 0 | 12 M | 43.5 | 12 P | 51.3 | 47.7 | 41.3 | 6.4 |
| 10 | 30.25 | 30.05 | 30.237 | 52.5 | 3 P | 36 0 | 12 P | 44.3 | 42.5 | 39.0 | 9.2 |
| 11 | 30.29 | 30.18 | 30.246 | 34.5 | 3 P | 31.0 | 4 A | 32.7 | 41.6 | 38 0 | 1.6 |
| 12 | 30 18 | 29 92 | 30.006 | 55 5 | 2 P | 43.5 | 7 A | 49.5 | 49 5 | 45 7 | 0.0 |
| 13 | 30.13 | 29 94 | 30.076 | 54 0 | 2:30 P | 31.0 | 6 A | 42.5 | 44.2 | 37.0 | 7.8 |
| 14 | 30.12 | 29 70 | 29.979 | 46.0 | 2:30 P | 32.0 | 7 A | 39.0 | 40.7 | 34.3 | 1.1 |
| 15 | 29.70 | 29.26 | 29.465 | 44 5 | 4 P | 38 0 | 3 A | 41.3 | 40.1 | 35.5 | 0.0 |
| 16 | 30.04 | 29 59 | 29 925 | 42.0 | 2 P | 29.0 | 12 P | 35.5 | 35 2 | 30.0 | 7.5 |
| 17 | 30.38 | 30.04 | 30 267 | 43 0 | 3 P | 26.5 | 3 A | 34.7 | 32.2 | 28.3 | 4.7 |
| 18 | 30.48 | 30.19 | 30.366 | 48.0 | 3 P | 20 0 | 7 A | 34.0 | 31.9 | 24 0 | 6.9 |
| 19 | 30.19 | 29 19 | 29.554 | 56.5 | 9 P | 26.5 | 0 A | 41.5 | 42 3 | 44.3 | 0.0 |
| 20 | 29.67 | 29.23 | 29.445 | 48 0 | 2 P | 39.0 | 9 P | 43.5 | 42.3 | 37.3 | 1.2 |
| 21 | 29.78 | 29.49 | 29 686 | 50.0 | 2 P | 35.0 | 7:30 P | 42.5 | 41.2 | 36.5 | 0.0 |
| 22 | 30.07 | 29.78 | 29.959 | 42.0 | 2 P | 30 5 | 7 A | 36 3 | 36.0 | 31.0 | 4 4 |
| 23 | 30.19 | 30 07 | 30.166 | 49 0 | 2 P | 27.0 | 7 A | 38.0 | 34 4 | 31.7 | 1.4 |
| 24 | 30.33 | 30.12 | 30.262 | 37.5 | 2 P | 28 5 | 12 P | 33 0 | 32.4 | 30.0 | 1.0 |
| 25 | 30.46 | 30 31 | 30 404 | 48.5 | 3:30 P | 23.5 | 7 A | 36 0 | 33.0 | 29 5 | 6 9 |
| 26 | 30.31 | 30 07 | 30.218 | 50.0 | 4 P | 23.0 | 7 A | 36.5 | 33.2 | 29 0 | 6.3 |
| 27 | 30.07 | 29.95 | 30.011 | 39 0 | 4 P | 24.0 | 7 A | 31.5 | 32.5 | 30.7 | 0.0 |
| 28 | 30 08 | 29 95 | 30.011 | 58.5 | 2:30 P | 32.5 | 7 A | 45 5 | 40.7 | 33.7 | 4 5 |
| 29 | 29.96 | 29 55 | 29 718 | 44.0 | 10:30 A | 30.0 | 1 A | 37.0 | 38 4 | 34.0 | 0.0 |
| 30 | 30.07 | 29.65 | 29.937 | 41.0 | 2 P | 26.5 | 12 P | 33 7 | 34.7 | 30.0 | 6.2 |

# DAILY SUMMARY.

| Day. | Humidity. |  |  | Wind. |  |  |  |  | Precipitation. |  |  |  |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
|  | Mean Dew Point. | Mean Force vapor. | Mean Relative Humidity. | Prevailing Direction. | Total Movement in Miles. | Maximum Pressure Per Square Ft | Miles per Hour. | Time. | Beginning. | Ending. | Total in Inches. Rain.** | Total in Inches. Snow. |
| 1 | 47.5 | .419 | 78.0 | S. | 224 | 2.0 | 20 | 1 A |  |  |  |  |
| 2 | 42.0 | .353 | 75.5 | W.N.W. | 230 | 15.5 | 56 | 2 P | 10 A | 1 P | .03 |  |
| 3 | 32.5 | .265 | 67.5 | N.W. | 382 | 7.5 | 39 | 3 P |  |  |  |  |
| 4 | 28.5 | .213 | 73.0 | S.W. | 112 | 2.0 | 20 | 12 P | 6 P | 12 P | .07 |  |
| 5 | 34.5 | .245 | 82.0 | N. | 251 | 3.0 | 24 | 7 P |  |  |  |  |
| 6 | 30.0 | .238 | 70.5 | N. | 267 | 6.0 | 34 | 8 A |  |  |  |  |
| 7 | 27.5 | .237 | 62.0 | N. | 269 | 6.0 | 34 | 9 A |  |  |  |  |
| 8 | 41.5 | .319 | 82.5 | N.N.E. | 99 | 1.0 | 14 | 12 P |  |  |  |  |
| 9 | 34.5 | .302 | 68.5 | W.N.W. | 226 | 10.0 | 44 | 7 P |  |  |  |  |
| 10 | 35.5 | .259 | 81.0 | N.W. | 328 | 7.0 | 37 | 10 A |  |  |  |  |
| 11 | 36.5 | .244 | 88.0 | S.S.W- | 17 | 0.0 | — | — |  |  |  |  |
| 12 | 42.0 | .357 | 75.5 | S. | 87 | 1.5 | 17 | 5 P | 7 P | 9 P | .02 |  |
| 13 | 30.5 | .262 | 64.0 | W.N.W. | 235 | 15.5 | 56 | 11 A |  |  |  |  |
| 14 | 26.5 | .240 | 61.5 | S. | 105 | 1.0 | 14 | 7 P | 7 P | 12 P | .05 |  |
| 15 | 28.0 | .237 | 67.5 | W.N.W. | 182 | 22.0 | 66 | 8 P | 0 A | 7 P | .96 |  |
| 16 | 23.0 | .190 | 69.0 | W. | 476 | 13.0 | 51 | 3 P |  |  |  |  |
| 17 | 24.0 | .167 | 79.0 | W. | 154 | 4.0 | 28 | 12 M | 11 A |  |  | T |
| 18 | 14.5 | .152 | 57.5 | N.W. | 83 | 1.0 | 14 | 1 A |  |  |  |  |
| 19 | 41.0 | .336 | 78.5 | S.W. | 139 | 6.0 | 34 | 8 P | 8 A | 10 P | .76 |  |
| 20 | 32.0 | .247 | 74.0 | S.W. | 424 | 6.5 | 36 | 9 A |  |  |  |  |
| 21 | 32.5 | .242 | 75.5 | W.S.W. | 215 | 5.5 | 33 | 2 P | 7 A | 8 P | .01 |  |
| 22 | 22.0 | .201 | 64.0 | W. | 248 | 2.5 | 22 | 12 M |  |  |  |  |
| 23 | 25.5 | .198 | 69.5 | S.W. | 150 | 2.0 | 20 | 12 M | 9 P |  |  | 0.5 |
| 24 | 27.5 | .170 | 92.0 | N. | 105 | 1.5 | 17 | 2 P |  |  |  |  |
| 25 | 26.0 | .174 | 81.5 | N.N.E. | 34 | 0.0 | — | — |  |  |  |  |
| 26 | 26.5 | .169 | 86.5 | N.N.E. | 6 | 0.0 | — | — |  |  |  |  |
| 27 | 29.0 | .178 | 95.0 | N.N.E. | 21 | 0.5 | 10 | 3 P | 2 P | 4 P | .02 |  |
| 28 | 31.0 | .208 | 83.5 | N.E. | 41 | 0.5 | 10 | 10 A |  |  |  |  |
| 29 | 29.0 | .217 | 75.5 | N. | 67 | 1.0 | 14 | 4 P | 4 A | 9 P | .28 |  |
| 30 | 21.5 | .184 | 63.5 | W. | 225 | 3.0 | 24 | 1 P |  |  |  |  |

**Rain or melted snow at base of tower. *Included in following day.

# REMARKS

The weather during November was slightly warmer than usual and the precipitation was somewhat deficient. During the first half of the month the wind movement was unusually large and numerous gales were registered on the pressure chart,—three showing a velocity of more than fifty miles per hour. The fluctuations of pressure shown by the barometer chart about the middle of the month were rather unusual, especially the drop of an inch in twenty hours on the 19th.

The records of the several weather elements show the following features of interest: The mean barometer was considerably less than the normal and the maximum and minimum pressures were both low. The range of pressure was practically normal. The total wind movement was about twenty per cent. more than the usual and most of the high wind was from the northwest quadrant.

The mean temperature was about one and one-half degrees higher than the normal and the maximum and minimum for the month were both several degrees above the usual values for these records. The range of temperature was practically normal. During the last half of the month there was comparatively little freezing weather and but very little ice was formed.

The mean dew point and relative humidity were both practically normal.

The total precipitation was just one inch less than the normal amount. Nearly the whole amount fell during the rapid falls of the of the barometer on the 15th and 19th.

The amount of sunshine recorded was a little less than usual.

The month closed with the temperature comparatively mild.

J. E. OSTRANDER, Meteorologist.

DAVID POTTER, Observer.

**BULLETIN No. 324. DECEMBER, 1915**

# Meteorological Observations
AT THE
# MASSACHUSETTS
# AGRICULTURAL EXPERIMENT
# STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.
*Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.*
*Height of Wind Instruments 72 ft.*

## MONTHLY SUMMARY.

### Pressure. In inches.

| | |
|---|---|
| Maximum reduced to freezing | 30.19, 31st, 12 P |
| Minimum reduced to freezing | 28.55, 26th, 9 A |
| Reduced† maximum reading | 30.52, 31st, 12 P |
| Reduced† minimum reading | 28.85, 26th, 9 A |
| Mean semi-daily reduced | 29.949 |
| Monthly range | 1.67 |

### *Air Temperature. In Degrees Fahr.

| | |
|---|---|
| Highest | 53.0, 26th, 4:30 A |
| Lowest | 2.0, 31st, 7 A |
| Mean hourly | 26.6 |
| Mean of means of max. and min. | 27.0 |
| Mean sensible (wet bulb) | 23.3 |
| Monthly range | 51.0 |
| Highest mean daily | 36.5, 18th |
| Lowest mean daily | 16.3, 31st |
| Mean maximum | 34.5 |
| Mean minimum | 19.4 |
| Mean daily range | 15.1 |
| Greatest daily range | 30.0, 26th |
| Least daily range | 6.0, 29th |

### Humidity.

| | |
|---|---|
| Mean dew point | 17.9 |
| Mean force of vapor | .162 |
| Mean relative humidity | 71.6 |

### Precipitation. In inches.

| | |
|---|---|
| Total precipitation | 5.86 |
| Number of days on which .01 inch or more rain fell | 12 |
| Total snow in inches | 12.3 |

### Wind.

| | |
|---|---|
| Total movement | 4947 m |
| Greatest daily movement | 490m, 4th |
| Least daily movement | 11m, 31st |
| Mean daily movement | 160 m |
| Mean hourly velocity | 6.7 m |

Maximum pressure per square foot, 13.0 lbs = 51 m per hour, 26th, 2 A, S.

Maximum velocity for 5 minutes, 48m per hour, 26th, 2 A, S.

Prevailing direction, West Northwest.

Summary.

| | |
|---|---|
| Northwest | 26 per cent |
| West Northwest | 16 " " |
| South Southwest | 13 " " |
| North | 10 " " |
| South | 10 " " |
| West Southwest | 10 " " |
| North Northwest | 10 " " |
| Other directions | 5 " " |

### Weather.

| | |
|---|---|
| Mean cloudiness observed | 55 per cent |
| Total cloudiness recorded by the Sun Thermometer | 177 hours = 62 per cent |
| Number of clear days | 9 |
| Number of fair days | 6 |
| Number of cloudy days | 16 |

### Bright Sunshine.

Number hours recorded, 106 hrs, = 38 per cent.

**Rain,** 2d, 8th, 9th, 13th, 14th, 17th, 18th, 23d, 25th, 26th, 28th, 29th.

**Hail,** 17th, 29th.

**Snow,** 2d, 6th, 8th, 9th, 13th, 14th, 19th, 20th, 26th, 28th, 29th.

**Gales,** 35 or more miles per hour: 40m, 10th, N.W.; 49m, 13th, N.N.W.; 49m, 14th, N.N.W.; 37m, 15th, W.. 37m, 18th, N.W.; 51m, 26th, S.

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* Temperature in ground shelter.

† Reduced to freezing and sea-level.

# DAILY SUMMARY.

| Day. | Barometer Reduced to Sea Level. | | | Temperature. Ground Shelter. | | | | | | | No. Hours of Bright Sunshine. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Maximun. | Minimum. | Mean. Semi-daily. | Maximum | Time. | Minimum. | Time. | Mean of Max. and Min. | Mean Hourly Draper. | Mean Sensible Wet Bulb. | |
| 1 | 30.19 | 30.06 | 30.161 | 41.0 | 3 P | 21.5 | 4 A | 31.3 | 28.0 | 22.7 | 7.2 |
| 2 | 30.17 | 30.08 | 30.101 | 33.0 | 2 P | 23.0 | 7 A | 28.0 | 27.9 | 25.7 | 0.0 |
| 3 | 30.09 | 29.96 | 30.018 | 39.0 | 2 P | 24.0 | 12 P | 31.5 | 30.4 | 26.0 | 5.0 |
| 4 | 30.08 | 29 98 | 30.046 | 34.0 | 1 P | 17 5 | 7 A | 25.7 | 26.3 | 22.3 | 6.5 |
| 5 | 30.09 | 30.03 | 30.068 | 38.0 | 2 P | 25.0 | 6 A | 31.5 | 29.7 | 24.3 | 6.0 |
| 6 | 30.11 | 30.00 | 30.061 | 33.5 | 3 P | 27.0 | 3 A | 30.3 | 30.7 | 27.7 | 9.4 |
| 7 | 30.19 | 30.08 | 30.146 | 33.0 | 2:30 P | 20 0 | 12 P | 26.5 | 28.0 | 22.3 | 0.0 |
| 8 | 30.08 | 29.53 | 29.723 | 31.0 | 11 P | 18.0 | 2 A | 24.5 | 24.6 | 23.5 | 0.0 |
| 9 | 29.53 | 29.37 | 29.432 | 35 0 | 2 P | 23.5 | 12 P | 29.3 | 28.4 | 22.7 | 0.1 |
| 10 | 29.91 | 29 52 | 29 788 | 27 0 | 3 P | 17.0 | 9 A | 22.0 | 22.0 | 17.0 | 5.1 |
| 11 | 30.12 | 29.91 | 30.099 | 28.0 | 3:30 P | 15.5 | 7 A | 21.7 | 20.5 | 16.7 | 8.1 |
| 12 | 30.13 | 30 03 | 30.081 | 36.0 | 3:30 P | 9.0 | 7:30 A | 22.5 | 20.9 | 14.3 | 0.0 |
| 13 | 30.03 | 29 05 | 29 623 | 32.0 | 11 P | 17.0 | 0 A | 24.5 | 25.6 | 22.7 | 0.0 |
| 14 | 29 57 | 29 02 | 29.361 | 32.0 | 7 A | 22.0 | 12 P | 27.0 | 26.9 | 21.7 | 0.0 |
| 15 | 29.88 | 29.57 | 29.733 | 25.0 | 2 P | 18.0 | 8 A | 21.5 | 21.5 | 14.3 | 0.0 |
| 16 | 30.18 | 29.88 | 30.038 | 32.0 | 2 P | 12.0 | 12 P | 22.0 | 21.6 | 16.7 | 0.0 |
| 17 | 30.19 | 29 67 | 29.946 | 30.0 | 12 P | 8.0 | 1 A | 19.0 | 18.0 | 16.5 | 0.0 |
| 18 | 29.68 | 29 22 | 29.499 | 40.0 | 9 P | 30 0 | 0 A | 35.0 | 36.5 | 37.0 | 0 0 |
| 19 | 30.01 | 29.68 | 29.902 | 39.0 | 1 A | 29.0 | 12 P | 34.0 | 34.7 | 30.7 | 5.3 |
| 20 | 30.12 | 29.99 | 30.095 | 32.5 | 3 P | 25.5 | 12 P | 29 0 | 28.3 | 27.0 | 8 4 |
| 21 | 30.13 | 29 95 | 30.076 | 34 0 | 2:30 P | 15.5 | 12 P | 24.7 | 22.6 | 17.7 | 8.0 |
| 22 | 30.32 | 30.13 | 30 284 | 31.0 | 2:30 P | 11.0 | 4 A | 21.0 | 21.2 | 18 0 | 7.5 |
| 23 | 30.23 | 29.80 | 30 014 | 35.0 | 12 P | 14.0 | 5 A | 24.5 | 26.3 | 24.7 | 5.0 |
| 24 | 30.18 | 29 79 | 30.058 | 40.0 | 3 P | 28 0 | 7 A | 34.0 | 34 0 | 30.7 | 0.5 |
| 25 | 30.19 | 29.55 | 29 914 | 48.0 | 12 P | 28.0 | 8:30 A | 38.0 | 33.3 | 31.5 | 0.5 |
| 26 | 30.04 | 28.85 | 29 405 | 53.0 | 4:30 A | 23.0 | 12 P | 38.0 | 35.7 | 33.0 | 0.0 |
| 27 | 30.17 | 29.98 | 30.096 | 35.5 | 3 P | 21.0 | 3 A | 28.0 | 28 8 | 27.3 | 7.1 |
| 28 | 30.02 | 29 85 | 29.958 | 34.0 | 4:30 A | 27.0 | 12 P | 30.5 | 31.7 | 31 7 | 0.0 |
| 29 | 30.13 | 29 72 | 29.972 | 27.0 | 0 A | 21.0 | 11 P | 24.0 | 23.6 | 22.5 | 0.0 |
| 30 | 30.39 | 29.84 | 30.279 | 31.0 | 3 P | 9 5 | 12 P | 20 3 | 20 7 | 16 5 | 8.3 |
| 31 | 30.52 | 30.26 | 30.435 | 30.5 | 6 P | 2.0 | 7 A | 16.3 | 16.3 | | 8.0 |

# DAILY SUMMARY.

| Day. | Humidity. | | | Wind. | | | | | Precipitation. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Mean Dew Point. | Mean Force vapor. | Mean Relative Humidity. | Prevailing Direction. | Total Movement in Miles. | Maximum Pressure Per Square Ft | Miles per Hour. | Time. | Beginning. | Ending. | Total in Inches. | |
| | | | | | | | | | | | Rain.** | Snow. |
| 1 | 11.5 | .145 | 55.5 | W.S.W. | 50 | 0.5 | 10 | 2 P | | | | |
| 2 | 19.0 | .152 | 73.0 | W.S.W. | 16 | 0.0 | — | — | 10 A | 12 P | .03 | 0.3 |
| 3 | 20.5 | .155 | 75.0 | W.S.W. | 62 | 0.5 | 10 | 4 P | | | | |
| 4 | 17.5 | .131 | 77.5 | N.W. | 104 | 3.0 | 24 | 6 P | | | | |
| 5 | 17.0 | .149 | 66.0 | N.W. | 64 | 3.0 | 24 | 12 M | | | | |
| 6 | 21.0 | .171 | 68.5 | N. | 174 | 4.0 | 28 | 12 M | 10 A | | | T |
| 7 | 10.5 | .145 | 51.0 | N.N.W. | 288 | 5.0 | 32 | 1 A | | | | |
| 8 | 16.5 | .154 | 64.5 | S.S.W. | 175 | 0.5 | 10 | 12 M | 5 A | 12 P | .12 | 0.7 |
| 9 | 12.5 | .144 | 56.5 | W.N.W. | 115 | 5.0 | 32 | 7 P | 0 A | 6 P | .06 | 0.3 |
| 10 | 5.5 | .110 | 54.5 | N.W. | 426 | 8.0 | 40 | 3 P | | | | |
| 11 | 8.0 | .106 | 67.0 | N.W. | 305 | 4.0 | 28 | 10 A | | | | |
| 12 | 7.0 | .096 | 67.5 | N.N.W. | 54 | 2.0 | 20 | 10 A | | | | |
| 13 | 15.0 | .142 | 63.5 | N.N.W. | 143 | 12.0 | 49 | 10 P | 6 A | 12 P | .51 | 6.0 |
| 14 | 7.0 | .144 | 44.5 | N.W. | 490 | 12.0 | 49 | 1 A | 0 A | 5 A | .17 | 2.0 |
| 15 | -21.5 | .112 | 14.0 | W. | 336 | 7.0 | 37 | 12 M | | | | |
| 16 | 11.0 | .109 | 54.0 | W.N.W. | 154 | 3.0 | 24 | 1 P | | | | |
| 17 | 12.5 | .093 | 78.0 | N.W. | 20 | 0.5 | 10 | 2 A | 9 A | 12 P | 1.08 | |
| 18 | 36.0 | .225 | 93.5 | N.W. | 133 | 7.0 | 37 | 6 P | 0 A | 7 P | 1.30 | |
| 19 | 26.0 | .189 | 77.0 | W.N.W. | 282 | 2.5 | 22 | 10 A | 3 P | | | T |
| 20 | 24.0 | .155 | 86.0 | W.N.W. | 208 | 3.0 | 24 | 10 A | 8 A | | | T |
| 21 | 8.5 | .112 | 60.5 | S. | 89 | 3.0 | 24 | 10 A | | | | |
| 22 | 11.5 | .114 | 68.0 | S. | 66 | 0.5 | 10 | 11 P | | | | |
| 23 | 23.5 | 142 | 96.0 | S. | 27 | 0.0 | — | — | 5 P | 12 P | .19 | |
| 24 | 28.5 | .180 | 88.0 | S.W. | 89 | 0.5 | 10 | 3 P | | | | |
| 25 | 29.0 | .185 | 89.5 | E.N.E. | 110 | 3.0 | 24 | 11 P | 5 P | 12 P | 1.20 | |
| 26 | 31.0 | .200 | 91.5 | W.N.W. | 482 | 13.0 | 51 | 2 A | 0 A | 10 P | .40 | T |
| 27 | 25.0 | .156 | 86.5 | S.S.W. | 126 | 1.0 | 14 | 9 A | | | | |
| 28 | 30.0 | .183 | 92.5 | S.S.W. | 30 | 0.0 | — | — | 10 A | 8 P | .26 | T |
| 29 | 21.0 | .124 | 93.0 | N.W. | 122 | 3.0 | 24 | 4 P | 10 A | 12 P | .54 | 2.0 |
| 30 | 13.5 | .099 | 84.5 | N. | 196 | 1.0 | 14 | 11 A | | | | |
| 31 | 14.0 | .106 | 82.0 | N. | 11 | 0.0 | – | — | | | | |

**Rain or melted snow at base of tower. *Included in following day.

# Annual Summary for 1915.

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### **Pressure.** In inches.

| | |
|---|---|
| Maximum reduced to freezing, | 30.26, Feb. 19th, 8 A. |
| Minimum reduced to freezing, | 28.55. Dec. 26th, 9 A. |
| Maximum reduced to freezing and sea-level, | 30.58, Feb. 19th, 8 A. |
| Minimum reduced to freezing and sea-level, | 28.85, Dec. 26th, 9 A. |
| Mean reduced to freezing and sea-level, | 29.992 |
| Annual range, | 1.73 |

### ***Air Temperature.** In degrees Fahr.

| | |
|---|---|
| Highest, | 93.0, Sept. 9th, 4P.; 15th, 1:30 P. |
| Lowest, | —4.0, Jan. 5th, 8 A. |
| Mean hourly, | 47.6 |
| Mean of means of max. and min., | 48.4 |
| Mean sensible (wet bulb), | 43.3 |
| Annual range, | 97.0 |
| Highest mean daily, | 79.4, Sept. 15 |
| Lowest mean daily, | 7.8, Jan. 30 |
| Mean maximum, | 58.6 |
| Mean minimum, | 38.3 |
| Mean daily range, | 20.3 |
| Greatest daily range, | 43.5, May 31 |
| Least daily range, | 3.0, May 17 |

### **Humidity.**

| | |
|---|---|
| Mean dew point, | 38.8 |
| Mean force of vapor, | .381 |
| Mean relative humidity, | 75.6 |

### **Wind.**

| | |
|---|---|
| Prevailing direction, | West Northwest |

Summary.

| | |
|---|---|
| Northewst, | 14 per cent. |
| South Southwest | 11 “ “ |
| West, | 10 “ “ |
| South | 10 “ “ |
| West Northwest | 10 “ “ |
| North Northwest | 10 “ “ |
| Other directions, | 33 “ “ |
| Total movement, | 50,486 m |
| Greatest daily movement, | 555 m., Mar. 3 |
| Least daily movement, | 1 m., Jan. 4 |
| Mean daily movement, | 141 m |
| Mean hourly velocity, | 5.9 m |

Maximum pressure per square foot, 22.0 lbs.=66 m. per hour, Nov. 15, 8 P., W.N.W.

Maximum velocity for 5 minutes, 48 m. per hour, July 5th, 10 A., S.S.E.; Sept. 26th, 7P., W.; Nov. 15th, 9 P., W.N.W., Dec. 26th, 2A., S.

### **Precipitation.** In inches.

| | |
|---|---|
| Total precipitation, rain or melted snow, | 51.58 |
| Number of days on which .01 or more rain or melted snow fell, | 122 |
| Snow total in inches, | 40.8 |

### **Weather.**

| | |
|---|---|
| Mean cloudiness observed, | 43 per cent. |
| Total cloudiness recorded by Sun Thermometer, | 2230 hrs.=50 per cent. |
| Number of clear days, | 82 |
| Number of fair days, | 156 |
| Number of cloudy days, | 127 |

### **Bright Sunshine.**

Number of hours recorded, 2224 hrs.=50 per cent.

### **Dates of Frosts.**

| | |
|---|---|
| Last, | May 20th |
| First, | Sept. 23d |

### **Dates of Snow.**

| | |
|---|---|
| Last, | April 3d |
| First, | Nov. 17th |
| Total days of sleighing, | 50 |

### **Gales of 50 or More Miles Per Hour.**

Jan. 13th, 50m., N.; Mar. 26th, 57m., W.; April 3d, 50m, N.; June 19th, 62m., S.S.W.; July 5th 57m., S S.E.: Sept. 26th, 54m, W.; Nov. 2d, 56 m, W.N.W.; 13th, 56m, W.N.W.; 15th, 66m W.N.W.; 16th 51m, W.N.W.; Dec. 26th, 51m, S.

*Temperature in ground shelter.

J. E. OSTRANDER,
*Meteorologist.*

DAVID POTTER,
*Observer.*

**BULLETIN No. 325. JANUARY, 1916**

# Meteorological Observations
AT THE
# MASSACHUSETTS
# AGRICULTURAL EXPERIMENT
# STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.
*Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.*
*Height of Wind Instruments 72 ft.*

## MONTHLY SUMMARY.

**Pressure.** In inches.

Maximum reduced to freezing, 30.31, 8th, 9 A; 29th, 10 A.
Minimum reduced to freezing, 29.17, 5th, 12 P
Reduced† maximum reading, 30.64, 8th, 9 A
Reduced† minimum reading, 29.47, 5th, 12 P

| | |
|---|---|
| Mean semi-daily reduced | 30.184 |
| Monthly range | 1.17 |

***Air Temperature.** In Degrees Fahr.

| | |
|---|---|
| Highest | 57.5, 28th, 9:30 A |
| Lowest | —5.0, 15th, 7:30 A |
| Mean hourly | 27.9 |
| Mean of means of max. and min. | 27.7 |
| Mean sensible (wet bulb) | 25.8 |
| Monthly range | 62.5 |
| Highest mean daily | 49.1, 27th |
| Lowest mean daily | 8.2 15th |
| Mean maximum | 36.1 |
| Mean minimum | 19.5 |
| Mean daily range | 16.6 |
| Greatest daily range | 32.0, 28th |
| Least daily range | 6.0, 12th |

**Humidity.**

| | |
|---|---|
| Mean dew point | 21.4 |
| Mean force of vapor | .166 |
| Mean relative humidity | 81.4 |

**Precipitation.** In inches.

| | |
|---|---|
| Total precipitation | 2.56 |
| Number of days on which .01 inch or more rain fell | 9 |
| Total snow in inches | 5.0 |

**Wind.**

| | |
|---|---|
| Total movement | 6341 m |
| Greatest daily movement | 435m, 14th |
| Least daily movement | 17m, 1st |
| Mean daily movement | 205 m |
| Mean hourly velocity | 8.5 m |

Maximum pressure per square foot, 25.0 lbs = 71 m per hour, 23d, 1 A, W.
Maximum velocity for 5 minutes, 36m per hour, 23d, 1 A, W.
Prevailing direction, West.

Summary.

| | |
|---|---|
| North | 19 per cent |
| South Southwest | 13 " " |
| West | 16 " " |
| South | 13 " " |
| Northwest | 16 " " |
| Other directions | 23 " " |

**Weather.**

| | |
|---|---|
| Mean cloudiness observed | 44 per cent |
| Total cloudiness recorded by the Sun Thermometer | 154 hours = 52 per cent |
| Number of clear days | 13 |
| Number of fair days | 3 |
| Number of cloudy days | 15 |

**Bright Sunshine.**

Number hours recorded, 140 hrs, = 48 per cent.

**Rain,** 1st, 2d, 3d, 5th, 10th, 13th, 20th, 27th, 30th.

**Hail,** 1st, 2d, 20th.

**Snow,** 2d. 3d, 10th, 16th, 17th, 20th, 30th.

**Days of Sleighing,** 23.

**Gales,** 35 or more miles per hour: 35m, 4th, S.S.W.; 36m, 5th, S.S.W.; 44m, 6th, N.W.; 40m, 14th, N.W.; 41m, 17th, W.N.W.; 59m, 22d, W.; 71m, 23d, W.; 44m, 28th, W.S.W.

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* Temperature in ground shelter.

† Reduced to freezing and sea-level.

# DAILY SUMMARY.

| Day. | Barometer Reduced to Sea Level. | | | Temperature. Ground Shelter. | | | | | | | No. Hours of Bright Sunshine. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Maximun. | Minimum. | Mean. Semi-daily. | Maximum | Time. | Minimum. | Time. | Mean of Max. and Min. | Mean Hourly Draper. | Mean Sensible Wet Bulb. | |
| 1 | 30.29 | 29.85 | 30.011 | 33.0 | 5 P | 20.0 | 3 A | 26.5 | 26.6 | 25.7 | 0.0 |
| 2 | 30.01 | 29.73 | 29.851 | 36.0 | 3 P | 23.0 | 6 A | 29.5 | 31.2 | 29.5 | 0.0 |
| 3 | 30.07 | 29.74 | 29.884 | 35.5 | 11 A | 20.0 | 12 P | 27.7 | 31.2 | 27.5 | 3.5 |
| 4 | 30.39 | 30.04 | 30.294 | 29.0 | 12 P | 11.0 | 7:30 A | 20.0 | 20.5 | 18.3 | 7.0 |
| 5 | 30.04 | 29.47 | 29.708 | 43.0 | 12 P | 29.0 | 0 A | 36.0 | 35.7 | 36.0 | 0.6 |
| 6 | 30.28 | 29.47 | 30.007 | 45.0 | 2 A | 18.0 | 12 P | 31.5 | 29.5 | 24.5 | 8.9 |
| 7 | 30.54 | 30.28 | 30.399 | 27.0 | 2 A | 8.0 | 12 P | 17.5 | 17.9 | 13.0 | 6.8 |
| 8 | 30.64 | 30.53 | 30.573 | 16.0 | 2 P | 0.0 | 7:30 A | 8.0 | 8.7 | 5.5 | 6.7 |
| 9 | 30.62 | 30.41 | 30.506 | 23.0 | 2:30 P | −2.0 | 8 A | 10.5 | 9.3 | 6.0 | 8.1 |
| 10 | 30.41 | 29.74 | 29.948 | 35.0 | 8 P | 13.0 | 0 A | 24.0 | 25.8 | 26.3 | 0.0 |
| 11 | 30.20 | 29.74 | 30.012 | 40.0 | 1:30 P | 28.0 | 12 P | 34.0 | 33.8 | 30.0 | 4.5 |
| 12 | 30.44 | 30.20 | 30.379 | 25.0 | 11 P | 19.0 | 9:30 A | 22.0 | 23.8 | 20.5 | 0.0 |
| 13 | 30.33 | 29.88 | 30.047 | 37.0 | 4 P | 24.0 | 12 P | 30.5 | 30.5 | 29.5 | 2.3 |
| 14 | 30.40 | 30.09 | 30.215 | 31.0 | 0 A | 4.0 | 12 P | 17.5 | 17.5 | 11.0 | 8.2 |
| 15 | 30.53 | 30.15 | 30.408 | 19.0 | 2:30 P | −5.0 | 7:30 A | 7.0 | 8.2 | 6.3 | 7.5 |
| 16 | 30.15 | 29.63 | 29.763 | 32.0 | 3 P | 19.0 | 0 A | 25.5 | 24.5 | 22.3 | 3.6 |
| 17 | 29.93 | 29.59 | 29.786 | 24.0 | 0 A | 10.0 | 8 A | 17.0 | 13.4 | 9.0 | 6.6 |
| 18 | 30.13 | 29.91 | 30.017 | 19.0 | 2 P | 6.0 | 0 A | 12.5 | 11.5 | 7.7 | 7.7 |
| 19 | 30.57 | 30.13 | 30.397 | 23.0 | 3 P | 8.0 | 6:30 A | 15.5 | 15.6 | 11.3 | 7.9 |
| 20 | 30.61 | 30.16 | 30.431 | 36.0 | 12 P | 17.0 | 3 A | 26.5 | 24.9 | 25.5 | 0.0 |
| 21 | 30.40 | 30.17 | 30.340 | 43.0 | 3 P | 36.0 | 0 A | 39.5 | 39.6 | 38.3 | 1.0 |
| 22 | 30.21 | 29.71 | 29.872 | 51.0 | 3 P | 37.0 | 5:30 A | 44.0 | 44.4 | 45.0 | 1.9 |
| 23 | 30.41 | 29.84 | 30.242 | 43.0 | 2 A | 28.5 | 11:30 P | 35.7 | 34.4 | 30.5 | 8.2 |
| 24 | 30.61 | 30.41 | 30.571 | 41.0 | 1 P | 22.0 | 2 A | 31.5 | 34.6 | 33.3 | 8.1 |
| 25 | 30.55 | 30.37 | 30.447 | 48.0 | 3 P | 30.0 | 0 A | 39.0 | 39.8 | 39.0 | 4.1 |
| 26 | 30.43 | 30.36 | 30.421 | 53.0 | 3 P | 40.5 | 6 A | 46.7 | 46.2 | 44.7 | 6.3 |
| 27 | 30.40 | 30.07 | 30.278 | 55.0 | 8:30 P | 45.0 | 10 A | 50.0 | 49.1 | 49.7 | 3.3 |
| 28 | 30.40 | 29.92 | 30.070 | 57.5 | 9:30 A | 25.5 | 12 P | 41.5 | 43.7 | 40.5 | 2.5 |
| 29 | 30.63 | 30.51 | 30.571 | 34.0 | 4 P | 16.5 | 7:30 A | 25.3 | 24.5 | 21.3 | 7.2 |
| 30 | 30.53 | 30.01 | 30.292 | 32.5 | 12 P | 20.5 | 3:30 A | 26.5 | 27.3 | 26.7 | 0.0 |
| 31 | 30.09 | 29.83 | 29.972 | 51.0 | 5 P | 32.0 | 1 A | 41.5 | 42.2 | 42.5 | 3.5 |

# DAILY SUMMARY.

| Day. | Humidity. | | | Wind. | | | | | Precipitation. | | Total in Inches. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Mean Dew Point. | Mean Force vapor. | Mean Relative Humidity. | Prevailing Direction. | Total Movement in Miles. | Maximum Pressure Per Square Ft | Miles per Hour. | Time. | Beginning. | Ending. | Rain.** | Snow. |
| 1 | 24.0 | .144 | 94.0 | N. | 17 | 1.0 | 14 | 6 P | 3 A | 12 P | .18 | |
| 2 | 26.5 | .173 | 84.0 | E.N.E. | 126 | 0.5 | 10 | 5 A | 0 A | 12 P | .62 | 2.75 |
| 3 | 23.0 | .166 | 76.0 | W.N.W. | 319 | 2.0 | 20 | 2 A | 0 A | 5 A | .11 | T |
| 4 | 15.5 | .108 | 85.0 | N. | 240 | 6.0 | 35 | 12 P | | | | |
| 5 | 32.5 | .225 | 87.0 | S.S.W. | 378 | 6.5 | 36 | 5 P | 2 A | 10 A | .11 | |
| 6 | 21.0 | .145 | 82.0 | N.W. | 242 | 9.5 | 44 | 8 A | | | | |
| 7 | 10.0 | .085 | 82.5 | N.W. | 80 | 3.0 | 24 | 3 P | | | | |
| 8 | −4.0 | .067 | 62.5 | N.W. | 150 | 3.0 | 24 | 8 A | | | | |
| 9 | 1.0 | .062 | 82.5 | N. | 67 | 1.0 | 14 | 0 A | | | | |
| 10 | 24.0 | .155 | 88.5 | N. | 59 | 1.5 | 17 | 8 P | 10 A | 11 P | .48 | 1.75 |
| 11 | 27.5 | .176 | 85.0 | W. | 190 | 3.0 | 24 | 4 P | | | | |
| 12 | 15.5 | .133 | 76.5 | N. | 150 | 2.5 | 22 | 5 A | | | | |
| 13 | 29.5 | .151 | 89.5 | N.W. | 149 | 3.5 | 26 | 8 P | 1 A | 1 P | .77 | |
| 14 | 4.5 | .084 | 72.5 | N.W. | 435 | 8.0 | 40 | 4 P | | | | |
| 15 | −1.5 | .071 | 66.5 | S.S.W. | 225 | 3.0 | 24 | 8 P | | | | |
| 16 | 18.5 | .131 | 78.0 | S. | 190 | 5.0 | 32 | 10 P | 6 A | | | T |
| 17 | 0.5 | .074 | 61.5 | W. | 367 | 8.5 | 41 | 7 A | 7 A | 4 P | | T |
| 18 | 1.5 | .068 | 71.5 | W.S.W. | 247 | 3.5 | 26 | 2 P | | | | |
| 19 | 6.0 | .065 | 70.5 | W. | 268 | 5.5 | 33 | 2 P | | | | |
| 20 | 23.0 | .150 | 80.0 | S. | 175 | 3.0 | 24 | 6 P | 10 A | 2 P | .09 | 0.5 |
| 21 | 35.5 | .247 | 86.0 | S.S.E. | 202 | 1.5 | 17 | 0 A | | | | |
| 22 | 40.5 | .315 | 80.0 | S.W. | 322 | 17.5 | 59 | 12 P | | | | |
| 23 | 27.0 | .184 | 80.0 | W. | 420 | 25.0 | 71 | 1 A | | | | |
| 24 | 29.0 | .211 | 75.5 | W.S.W. | 90 | 2.5 | 22 | 7 P | | | | |
| 25 | 38.0 | .249 | 91.5 | S.S.W. | 208 | 2.5 | 22 | 10 A | | | | |
| 26 | 44.0 | .304 | 94.0 | S. | 148 | 1.5 | 17 | 3 A | | | | |
| 27 | 48.5 | .369 | 93.5 | S. | 93 | 4.5 | 30 | 11 P | 1 A | 5 A | .08 | |
| 28 | 38.0 | .280 | 84.0 | W. | 317 | 9.5 | 44 | 11 A | | | | |
| 29 | 16.5 | .127 | 77.0 | N. | 236 | 4.0 | 28 | 7 A | | | | |
| 30 | 25.0 | .150 | 94.0 | E.S.E. | 50 | 1.5 | 17 | 11 A | 6 A | 11 P | .12 | T |
| 31 | 41.5 | .283 | 94.0 | S.S.W. | 181 | 5.0 | 32 | 1 P | | | | |

** Rain or melted snow at base of tower.

*Included in following day.

## REMARKS

The weather during January was unusually variable ; ranging from midwinter conditions during the first part of the month to early spring conditions near the close of the month. The variations in temperature presented, resulted in a monthly range of temperature considerably larger than usual. The precipitation was considerably less than the normal and nearly all of it occurred during the first half of the month. A generally high barometer prevailed during the month and while there were a number of fluctuations of considerable magnitude, the range of pressure was only about two-thirds of the normal amount.

A comparison of the records for the month of the several weather elements with the normals for this station, shows the following characteristics of interest: The mean barometer was more than one-tenth of an inch above the normal and the highest January record since 1907. The maximum pressure was lower than usual and the minimum rather high, resulting in the small range referred to above. The total wind movement was about one-fourth more than the normal and numerous gales were recorded, Nearly all the wind was from the westerly points of the compass.

The mean temperature was more than three degrees above the normal, due to the comparatively high temperatures during the last third of the month. The maximum temperature was over six degrees higher than the normal value, while the minimum was two degrees higher. Zero temperature was reached on only three dates.

The mean dew point and relative humidity were both several points above the normal value.

The total precipitation was nine-tenths of an inch less than the normal and only five inches of snow occurred.

The records for sunshine and cloudiness were not far from average value.

J. E. OSTRANDER, Meteorologist.

DAVID POTTER, Observer.

**BULLETIN No. 326.** **FEBRUARY, 1916**

# Meteorological Observations
AT THE
# MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.
*Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.*
*Height of Wind Instruments 72 ft.*

## MONTHLY SUMMARY.

**Pressure.** In inches.

| | |
|---|---|
| Maximum reduced to freezing | 30.27, 14th, 1 P |
| Minimum reduced to freezing | 28.45, 25th, 12 P |
| Reduced† maximum reading | 30.60, 14th, 1 P |
| Reduced† minimum reading | 28.76, 25th, 12 P |
| Mean semi-daily reduced | 30.005 |
| Monthly range | 1.84 |

***Air Temperature.** In Degrees Fahr.

| | |
|---|---|
| Highest | 47.5, 1st, 0 A |
| Lowest | —16.0, 15th, 9 A |
| Mean hourly | 20.4 |
| Mean of means of max. and min. | 20.1 |
| Mean sensible (wet bulb) | 17.8 |
| Monthly range | 63.5 |
| Highest mean daily | 40.7, 1st |
| Lowest mean daily | 1.3 15th |
| Mean maximum | 28.6 |
| Mean minimum | 11.5 |
| Mean daily range | 17.1 |
| Greatest daily range | 39.5, 15th |
| Least daily range | 5.5, 12th |

**Humidity.**

| | |
|---|---|
| Mean dew point | 13.0 |
| Mean force of vapor | .116 |
| Mean relative humidity | 79.9 |

**Precipitation.** In inches.

| | |
|---|---|
| Total precipitation | 5.27 |
| Number of days on which .01 inch or more rain fell | 14 |
| Total snow in inches | 16¾ |

* Temperature in ground shelter.
† Reduced to freezing and sea-level.

**Wind.**

| | |
|---|---|
| Total movement | 5504 m |
| Greatest daily movement | 519m, 28th |
| Least daily movement | 37m, 17th |
| Mean daily movement | 190 m |
| Mean hourly velocity | 7.9 m |

Maximum pressure per square foot, 16.0 lbs = 57 m per hour, 28th, 3 A, W.N.W.

Maximum velocity for 5 minutes, 36m per hour, 28th, 4 A, W.N.W.

Prevailing direction, West Northwest.

Summary.

| | |
|---|---|
| North | 14 per cent |
| South Southwest | 10 " " |
| West | 17 " " |
| West Northwest | 10 " " |
| Northwest | 21 " " |
| Other directions | 28 " " |

**Weather.**

| | |
|---|---|
| Mean cloudiness observed | 59 per cent |
| Total cloudiness recorded by the Sun Thermometer | 156 hours = 53 per cent |
| Number of clear days | 8 |
| Number of fair days | 9 |
| Number of cloudy days | 12 |

**Bright Sunshine.**

Number hours recorded, 140 hrs, = 47 per cent

**Rain,** 1st, 6th, 18th, 23d, 24th, 25th, 26th.

**Hail,** 23d.

**Snow,** 2d. 3d, 8th, 9th, 11th, 12th, 13th, 16th 17th, 18th, 23d. 26th, 27th.

**Days of Sleighing,** 28.

**Gales,** 35 or more miles per hour: 54m, 7th, W.N,W.; 47m, 8th, W.; 36m, 10th, W.; 51m, 19th, W.; 46m, 27th, W.N.W.; 57m, 28th, W.N.W.

# DAILY SUMMARY.

| Day. | Barometer Reduced to Sea Level. | | | Temperature. Ground Shelter. | | | | | | | No. Hours of Bright Sunshine. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Maximum. | Minimum. | Mean. Semi-daily. | Maximum | Time. | Minimum. | Time. | Mean of Max. and Min. | Mean Hourly Draper. | Mean Sensible Wet Bulb. | |
| 1 | 30.28 | 29.83 | 30 092 | 47.5 | 0 A | 31.5 | 12 P | 39.5 | 40.7 | 38.7 | 0.0 |
| 2 | 30.39 | 30.17 | 30.311 | 31.5 | 0 A | 19.5 | 12 P | 25.5 | 24.2 | 22.7 | 0.1 |
| 3 | 30.28 | 30.03 | 30.104 | 27.0 | 2:30 P | 16.5 | 12 P | 21.7 | 21.1 | 19.0 | 5.3 |
| 4 | 30.47 | 30.28 | 30.418 | 24.5 | 3 P | 9.5 | 8:30 A | 17.0 | 15.7 | 11.5 | 9.2 |
| 5 | 30.38 | 30.11 | 30.234 | 30.0 | 10 P | 11.5 | 7:30 A | 20 7 | 21.8 | 18.7 | 4.9 |
| 6 | 30.15 | 29.78 | 30.021 | 40.0 | 3 P | 18.5 | 9 A | 29.3 | 30.9 | 28.3 | 3.3 |
| 7 | 30.06 | 29.60 | 29.769 | 37.5 | 10:30 A | 14.5 | 12 P | 26.0 | 27.6 | 24.3 | 2.8 |
| 8 | 30.40 | 30.06 | 30.319 | 26.0 | 11 A | 12.5 | 4:30 A | 19 3 | 18.2 | 16.0 | 6.7 |
| 9 | 30.31 | 30 03 | 30 103 | 30.5 | 10:30 A | 15.0 | 3 A | 22.7 | 22.2 | 21.3 | 4.5 |
| 10 | 30.34 | 30.05 | 30.201 | 30.5 | 10:30 A | 21.0 | 12 P | 25.7 | 26.9 | 25.3 | 8.3 |
| 11 | 30.47 | 30.30 | 30.394 | 22.0 | 1 P | 9.5 | 8 A | 15.7 | 17.3 | 12.5 | 4.4 |
| 12 | 30.35 | 30.12 | 30.236 | 18.5 | 0 A | 13.0 | 10 P | 15.7 | 16.6 | 15.0 | 0.0 |
| 13 | 30.49 | 30.25 | 30.350 | 20.0 | 3:30 P | 6.5 | 12 P | 13.3 | 14.6 | 12.7 | 0.0 |
| 14 | 30.60 | 30.49 | 30.379 | 12.5 | 3:30 P | −7.0 | 12 P | 2.7 | 1.8 | −3.0 | 7.8 |
| 15 | 30.54 | 30.20 | 30.328 | 23.5 | 5 P | −16.0 | 9 A | 3.7 | 1.3 | −3.3 | 7.8 |
| 16 | 30.16 | 29.85 | 29.993 | 30.5 | 5 P | −0.5 | 8 A | 15 0 | 16.5 | 12.5 | 6.1 |
| 17 | 29.85 | 29.79 | 29.812 | 41.0 | 3 P | 25.0 | 1 A | 33.0 | 29.9 | 27.0 | 3.9 |
| 18 | 29.78 | 29 34 | 29.548 | 34.5 | 3 P | 24.0 | 12 P | 29.3 | 30.5 | 29.5 | 0.0 |
| 19 | 29.92 | 29.34 | 29.630 | 12.0 | 4 P | 2.0 | 12 P | 7.0 | 9.1 | 4.3 | 9.8 |
| 20 | 30.17 | 29 91 | 29.969 | 19.5 | 3 P | −4.0 | 5 A | 7.7 | 10.0 | 8.3 | 5.7 |
| 21 | 30.50 | 29 88 | 30.401 | 13.0 | 4:30 P | −4.5 | 7:30 A | 4.3 | 3.1 | −1.7 | 10.0 |
| 22 | 30.30 | 29.87 | 30.108 | 37.5 | 4 P | −2.0 | 1 A | 17.7 | 20.7 | 19.3 | 8.1 |
| 23 | 30.01 | 29.82 | 29.911 | 33.0 | 1 P | 21.5 | 7 A | 27.3 | 27.5 | 29 3 | 0 0 |
| 24 | 30.24 | 29 88 | 30.120 | 31.5 | 2:30 P | 17.5 | 8 A | 24 5 | 26.5 | 21 7 | 3.7 |
| 25 | 29.88 | 28.76 | 29.354 | 42.5 | 7 P | 29.5 | 0 A | 36.0 | 36.5 | 36.5 | 0 0 |
| 26 | 29.37 | 28.76 | 29 151 | 38.5 | 3 A | 25.5 | 12 P | 32.0 | 31.5 | 29 7 | 0.0 |
| 27 | 29.41 | 29 24 | 29.311 | 25.5 | 0 A | 10.0 | 12 P | 17.7 | 17.2 | 14.3 | 8.6 |
| 28 | 29.81 | 29.41 | 29 669 | 21.0 | 2 P | 7.0 | 3 A | 14.0 | 12.9 | 11.5 | 8.2 |
| 29 | 30.03 | 29.81 | 29.913 | 29.0 | 4 P | 7.5 | 3:30 A | 18.3 | 17.7 | 15.5 | 10.3 |

# DAILY SUMMARY.

| Day. | Humidity. | | | Wind. | | | | | Precipitation. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Total in Inches. | |
| | Mean Dew Point. | Mean Force vapor. | Mean Relative Humidity. | Prevailing Direction. | Total Movement in Miles. | Maximum Pressure Per Square Ft | Miles per Hour. | Time. | Beginning. | Ending. | Rain.** | Snow. |
| 1 | 36.5 | .251 | 85.0 | N.W. | 169 | 4.5 | 30 | 4 P | 0 A | 5 A | .04 | |
| 2 | 20.5 | .128 | 90.0 | N.W. | 230 | 3.5 | 26 | 5 P | 7 A | 12 P | .12 | ¾ |
| 3 | 16.0 | .110 | 86.0 | W.N.W. | 280 | 5.5 | 33 | 4 P | 0 A | 5 P | .20 | 1¼ |
| 4 | 7.5 | .081 | 78.0 | W.S.W. | 223 | 2.5 | 22 | 1 P | | | | |
| 5 | 14.0 | .118 | 76.0 | S. | 86 | 2.0 | 20 | 3 P | | | | |
| 6 | 25.5 | .171 | 87.5 | S.S.W. | 75 | 1.0 | 14 | 3 P | 8 P | | T | |
| 7 | 21.0 | .147 | 84.0 | W. | 309 | 14.5 | 54 | 3 P | | | | |
| 8 | 10.0 | .101 | 70.0 | W. | 233 | 11.0 | 47 | 5 A | 8 P | 12 P | .12 | 1½ |
| 9 | 19.0 | .122 | 86.5 | E.S.E. | 189 | 0.5 | 10 | 1 A | 0 A | 5 A | .06 | ½ |
| 10 | 23.5 | .143 | 88.0 | W. | 235 | 6.5 | 36 | 9 A | | | | |
| 11 | 8.0 | .086 | 75.5 | W.S.W. | 140 | 2.0 | 20 | 4 A | 2 P | 12 P | .48 | 2¾ |
| 12 | 12.0 | .088 | 81.0 | N.N.W. | 92 | 1.5 | 17 | 11 P | 0 A | 12 P | .79 | 4¼ |
| 13 | 10.0 | .083 | 86.0 | N. | 350 | 5.0 | 32 | 7 P | 0 A | 7 P | .83 | 4½ |
| 14 | −20.5 | .043 | 38.5 | N. | 235 | 5.0 | 32 | 10 A | | | | |
| 15 | −34.5 | .049 | 38.5 | N.N.E. | 38 | 0.0 | — | — | | | | |
| 16 | 8.5 | .098 | 82.5 | S.E. | 44 | 0.5 | 10 | 5 P | 9 P | 12 P | .08 | ¾ |
| 17 | 26.0 | .154 | 44.5 | S.S.W. | 37 | 0.0 | — | — | 0 A | | T | T |
| 18 | 27.5 | .172 | 87.5 | N.W. | 44 | 4.0 | 28 | 12 P | 2 P | 9 P | .19 | ½ |
| 19 | −5.5 | .059 | 58.5 | N.W. | 420 | 13.0 | 51 | 4 P | | | | |
| 20 | 3.0 | .072 | 76.0 | S.W. | 138 | 4.0 | 28 | 4 P | | | | |
| 21 | −6.5 | .043 | 75.0 | W. | 133 | 4.0 | 28 | 6 A | | | | |
| 22 | 14.0 | .124 | 76.0 | S.S.W. | 178 | 3.5 | 26 | 12 M | | | | |
| 23 | 23.5 | .143 | 88.0 | W. | 70 | 1.0 | 14 | 3 P | 12 M | 3 P | .21 | T |
| 24 | 19.0 | .128 | 80.0 | N. | 120 | 1.0 | 14 | 12 P | 12 M | 12 P | .27 | |
| 25 | 35.5 | .221 | 95.5 | N. | 218 | 2.5 | 22 | 4 A | 0 A | 12 P | 1.14 | |
| 26 | 28.0 | .173 | 89.5 | N.W. | 224 | 3.0 | 24 | 6 P | 0 A | 1 P | .74 | T |
| 27 | 11.5 | .089 | 86.5 | W.N.W. | 384 | 10.5 | 46 | 12 P | 6 P | | T | T |
| 28 | 10.5 | .075 | 93.0 | W.N.W. | 519 | 16.0 | 57 | 3 A | | | | |
| 29 | 12.5 | .095 | 84.0 | N.W. | 91 | 3.0 | 24 | 4 P | | | | |

**Rain or melted snow at base of tower.

*Included in following day.

## REMARKS

During February the weather was cold and wintry without exception. The highest temperature was recorded at the beginning of the first day of the month, and zero temperature was reached on several dates. Following the high temperature which prevailed during the last part of January, the low temperature of the month was especially noticeable. The precipitation was large, especially the snowfall, and sleighing was continuous after the first day. The snow storm of the 11th—13th was one of the heaviest in recent years here.

An examination of the records of the several weather elements shows the following as the most important features. The mean barometer was nearly normal and the range unusually large, owing to the very low minimum record. Owing to the breaking of the Draper barometer, the maximum and minimum pressures, after the 11th, were taken from a barograph, and are not as precise as the Draper records. The marked barometric activity resulted in a total wind movement considerably more than the normal.

The mean temperature was nearly four degrees lower than the normal and more than seven degrees lower than the mean of the preceding month. The minimum temperature was about eight degrees lower than the normal value for this feature and gave a large range for the month.

The mean dew point was about four degrees below the normal and the relative humidity slightly higher than usual.

The total precipitation was two inches more than the normal, and was well distributed throughout the month. The amount of cloudiness was considerably more than usual.

J. E. OSTRANDER, Meteorologist.

DAVID POTTER, Observer.

**BULLETIN No. 327. MARCH, 1916**

# Meteorological Observations
AT THE
# MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.
*Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.*
*Height of Wind Instruments 72 ft.*

## MONTHLY SUMMARY.

### **Pressure.** In inches.

| | |
|---|---|
| Maximum reduced to freezing, | 30.12, 2d, 3 A |
| Minimum reduced to freezing, | 28.87, 8th, 12 P |
| Reduced† maximum reading, | 30.44, 2d, 3 A |
| Reduced† minimum reading, | 29.19, 8th, 12 P |
| Mean semi-daily reduced | 29.955 |
| Monthly range | 1.25 |

### ***Air Temperature.** In Degrees Fahr.

| | |
|---|---|
| Highest | 66.0, 31st, 3:30 P |
| Lowest | 0.0, 11th, 11 P |
| Mean hourly | 26.4 |
| Mean of means of max. and min. | 26.8 |
| Mean sensible (wet bulb) | 25.2 |
| Monthly range | 66.0 |
| Highest mean daily | 49.0, 30th |
| Lowest mean daily | 10.0 17th |
| Mean maximum | 36.7 |
| Mean minimum | 16.9 |
| Mean daily range | 19.8 |
| Greatest daily range | 43.5, 26th |
| Least daily range | 8.0, 9th |

### **Humidity.**

| | |
|---|---|
| Mean dew point | 22.4 |
| Mean force of vapor | .156 |
| Mean relative humidity | 86.8 |

### **Precipitation.** In inches.

| | |
|---|---|
| Total precipitation | 3.97 |
| Number of days on which .01 inch or more rain fell | 12 |
| Total snow in inches | 22 |

* Temperature in ground shelter.
† Reduced to freezing and sea-level.

### **Wind.**

| | |
|---|---|
| Total movement | 5556 m |
| Greatest daily movement | 461m, 16th |
| Least daily movement | 18m, 27th |
| Mean daily movement | 147 m |
| Mean hourly velocity | 6.1 m |

Maximum pressure per square foot, 10.0 lbs = 45 m per hour, 9th, 12 M, W.

Maximum velocity for 5 minutes, 30m per hour, 9th, 1½ P, W.

Prevailing direction, West.

Summary.

| | |
|---|---|
| North Northwest | 13 per cent |
| North | 13 " " |
| West | 19 " " |
| Northeast | 10 " " |
| South Southwest | 10 " " |
| West Northwest | 16 " " |
| Other directions | 19 " " |

### **Weather.**

| | |
|---|---|
| Mean cloudiness observed | 43 per cent |
| Total cloudiness recorded by the Sun Thermometer | 154 hours = 42 per cent |
| Number of clear days | 15 |
| Number of fair days | 8 |
| Number of cloudy days | 8 |

### **Bright Sunshine.**

Number hours recorded, 217 hrs, = 58 per cent

**Rain.** 5th, 6th, 7th.

**Snow.** 2d. 5th, 6th, 7th, 8th, 9th, 10th, 13th, 14th, 15th, 19th, 21st, 22d.

**Days of Sleighing,** 29.

**Gales.** 35 or more miles per hour: 39m, 1st, N.N.W.; 40m, 4th, W.N.W.: 38m, 5th, W.N.W.; 45m, 9th, W.; 35m, 10th, S.S.W.; 35m, 13th, W.N.W.; 38m, 16th, N.W.; 37m, 23d, W.

# DAILY SUMMARY.

| Day. | Barometer Reduced to Sea Level. | | | Temperature. Ground Shelter. | | | | | | | No. Hours of Bright Sunshine. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Maximun. | Minimum. | Mean, Semi-daily. | Maximum | Time. | Minimum. | Time. | Mean of Max. and Min. | Mean Hourly Draper. | Mean Sensible Wet Bulb. | |
| 1 | 30.41 | 29.97 | 30.275 | 28.5 | 5 P | 11.0 | 6:30 A | 19.7 | 19.8 | 17.3 | 9.6 |
| 2 | 30.44 | 30.04 | 30.119 | 24.0 | 4 P | 14.0 | 9 A | 19.0 | 19.8 | 18.7 | 0.7 |
| 3 | 30.09 | 30.04 | 30 067 | 29.5 | 3:30 P | 18.5 | 5 A | 24.0 | 22.5 | 19.7 | 9.4 |
| 4 | 30.10 | 29.71 | 29.929 | 26.0 | 2 P | 12.5 | 10 P | 19 3 | 19 9 | 16.3 | 9.8 |
| 5 | 30.32 | 29.65 | 29 960 | 25.0 | 1 P | 12.0 | 12 P | 18.5 | 17.6 | 14.3 | 8.3 |
| 6 | 30.31 | 30.19 | 30.285 | 23.0 | 10:30 A | 6.0 | 4 A | 14.5 | 17.0 | 18.0 | 6.0 |
| 7 | 30.19 | 29.57 | 29.607 | 31.5 | 1 P | 17.5 | 0 A | 24.5 | 27.5 | 28.0 | 0.4 |
| 8 | 29.61 | 29.19 | 29.391 | 31.0 | 0 A | 18.5 | 11 P | 24.7 | 25.5 | 23.3 | 0.0 |
| 9 | 29.89 | 29 19 | 29 681 | 27.0 | 8 A | 19 0 | 0 A | 23.0 | 22.2 | 22.0 | 6.5 |
| 10 | 29.86 | 29.56 | 29.701 | 31.0 | 11 A | 17.0 | 12 P | 24.0 | 23.7 | 23.3 | 2.7 |
| 11 | 30.25 | 29.86 | 30.064 | 26.5 | 1 P | 0.0 | 11 P | 13.3 | 18.2 | 18.0 | 10.5 |
| 12 | 30.20 | 29.92 | 30.091 | 34.0 | 8 A | 3.5 | 0 A | 18.7 | 28.3 | 31.3 | 9.1 |
| 13 | 29.92 | 29.50 | 29.641 | 39.0 | 4 P | 27.5 | 12 P | 33.3 | 33.0 | 31.7 | 6.7 |
| 14 | 29.98 | 29.87 | 29.974 | 38.0 | 1 P | 25.5 | 5 A | 31.7 | 21.0 | 28.5 | 3.6 |
| 15 | 30.03 | 29 94 | 29.991 | 30.0 | 0 A | 15.0 | 9 A | 22.5 | 17 8 | 16.3 | 0.0 |
| 16 | 29.97 | 29.79 | 29.844 | 24.5 | 7:30 A | 7.0 | 12 P | 15.7 | 16.0 | 15 7 | 9.5 |
| 17 | 30.06 | 29 86 | 29.949 | 20.0 | 1:30 P | 1.5 | 4 A | 10 7 | 10.0 | 8.7 | 10.5 |
| 18 | 30.20 | 30.07 | 30.156 | 22.0 | 4 P | 2.5 | 0 A | 12.3 | 11.9 | 11.0 | 8.8 |
| 19 | 30.11 | 29 81 | 29.979 | 29.0 | 4:30 P | 10 0 | 6 A | 19 5 | 19.0 | 17 0 | 9.5 |
| 20 | 30.22 | 30.05 | 30.178 | 27.0 | 2:30 P | 18.0 | 9 A | 22.5 | 22.3 | 19.5 | 9.6 |
| 21 | 29.97 | 29.63 | 29.823 | 36.5 | 4:30 P | 20 0 | 4 A | 28.3 | 27.0 | 25 7 | 7.4 |
| 22 | 29.63 | 29.45 | 29.687 | 38 0 | 1 P | 12.5 | 7 A | 25.3 | 22.3 | 20.5 | 0.0 |
| 23 | 30.06 | 29.45 | 29.918 | 35.0 | 2:30 P | 16.0 | 3 A | 25.5 | 25.4 | 26.5 | 10.7 |
| 24 | 30.13 | 30.05 | 30 095 | 40.0 | 2:30 P | 12.0 | 5:30 A | 26.0 | 27.9 | 25.0 | 8.5 |
| 25 | 30.21 | 30.03 | 30.127 | 55.0 | 2 P | 23.5 | 6 A | 39.3 | 38.6 | 35.7 | 10 7 |
| 26 | 30.13 | 30.04 | 30.120 | 65.0 | 4 P | 21.5 | 7 A | 43.3 | 41.7 | 41.3 | 11.4 |
| 27 | 30.14 | 30.00 | 30.070 | 63.5 | 4:30 P | 30 0 | 6 A | 46 7 | 42.2 | 40.3 | 8.5 |
| 28 | 30.04 | 29.86 | 29 946 | 58.5 | 4 P | 26.5 | 7 A | 42.5 | 42.0 | 40 0 | 8.9 |
| 29 | 29.98 | 29.88 | 29.944 | 50.0 | 3 P | 31.5 | 4:30 A | 40.7 | 41.8 | 39 5 | 0.4 |
| 30 | 30 09 | 29.98 | 30.036 | 64.0 | 3 P | 40 0 | 3 A | 52.0 | 49.0 | 43.7 | 8.9 |
| 31 | 30.11 | 30.01 | 30.066 | 66.0 | 3:30 P | 35.5 | 5 A | 50.7 | 48.4 | 44.3 | 10.8 |

# DAILY SUMMARY.

| | Humidity. | | | Wind. | | | | | Precipitation. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Total in Inches. | |
| Day. | Mean Dew Point. | Mean Force vapor. | Mean Relative Humidity. | Prevailing Direction. | Total Movement in Miles. | Maximum Pressure Per Square Ft | Miles per Hour. | Time. | Beginning. | Ending. | Rain.** | Snow. |
| 1 | 13.5 | .103 | 80.5 | E. | 108 | 7.5 | 39 | 10 A | | | | |
| 2 | 17.5 | .108 | 92.0 | N.N.W. | 84 | 1.0 | 14 | 2 P | 1 A | 10 A | .08 | ½ |
| 3 | 16.5 | .114 | 83.0 | N.N.W. | 174 | 3.5 | 26 | 10 A | | | | |
| 4 | 13.0 | .098 | 80.0 | W.N.W. | 398 | 8.0 | 40 | 2 P | | | | |
| 5 | 10.0 | .065 | 78.0 | W. | 215 | 7.0 | 38 | 4 P | 11 A | | T | T |
| 6 | 16.0 | .104 | 88.5 | S.S.W. | 92 | 1.5 | 17 | 4 P | 3 P | 12 P | .76 | 1 |
| 7 | 27.0 | .156 | 94.5 | N.N.W. | 100 | 2.0 | 20 | 4 A | 0 A | 12 P | .08 | ¼ |
| 8 | 22.0 | .134 | 84.5 | N. | 199 | 5.0 | 32 | 5 P | 0 A | 7 P | 1.08 | 2¼ |
| 9 | 20.5 | .124 | 92.5 | W. | 379 | 10.0 | 45 | 12 M | 0 A | 7 P | .17 | ½ |
| 10 | 21.5 | .129 | 90.0 | S.S.W. | 294 | 6.0 | 35 | 12 M | 3 A | 10 A | .09 | ¼ |
| 11 | 17.0 | .103 | 91.0 | W.N.W. | 142 | 4.0 | 28 | 9 A | | | | |
| 12 | 29.5 | .180 | 92.5 | W. | 75 | 2.0 | 20 | 11 P | | | | |
| 13 | 30.5 | .183 | 92.5 | W. | 294 | 6.0 | 35 | 10 A | 2 A | 8 A | .38 | 5¼ |
| 14 | 26.5 | .163 | 89.5 | N.N.W. | 145 | 0.0 | — | — | 5 P | 12 P | .27 | 3 |
| 15 | 15.0 | .095 | 90.5 | N. | 354 | 3.5 | 26 | 2 A | 0 A | 11 P | .48 | 4½ |
| 16 | 12.0 | .099 | 81.0 | W. | 461 | 7.0 | 38 | 4 P | | | | |
| 17 | 7.0 | .068 | 92.0 | W.N.W. | 266 | 5.5 | 33 | 10 A | | | | |
| 18 | 8.5 | .076 | 85.0 | W. | 108 | 0.5 | 10 | 10 A | | | | |
| 19 | 15.0 | .103 | 91.0 | W.N.W. | 156 | 2.5 | 22 | 12 M | 0 A | 4 A | .04 | ¼ |
| 20 | 17.0 | .113 | 85.5 | W.S.W. | 218 | 2.0 | 20 | 9 A | | | | |
| 21 | 23.5 | .145 | 88.5 | S.S.W. | 107 | 1.0 | 14 | 10 A | 0 A | 11 A | .15 | 1¼ |
| 22 | 19.5 | .114 | 95.5 | N.W. | 106 | 2.0 | 20 | 11 P | 8 A | 10 P | .39 | 3 |
| 23 | 18.5 | .139 | 83.5 | W.N.W. | 375 | 7.0 | 37 | 10 A | | | | |
| 24 | 22.5 | .146 | 87.5 | W.S.W. | 200 | 3.0 | 24 | 11 A | | | | |
| 25 | 34.0 | .226 | 86.0 | N.E. | 99 | 4.5 | 30 | 1 P | | | | |
| 26 | 39.0 | .285 | 86.5 | N. | 70 | 1.0 | 14 | 8 P | | | | |
| 27 | 37.5 | .274 | 84.0 | S. | 18 | 0.0 | — | — | | | | |
| 28 | 37.0 | .272 | 81.0 | E.S.E. | 40 | 0.5 | 10 | 6 P | | | | |
| 29 | 36.0 | .267 | 80.5 | N.E. | 95 | 4.0 | 28 | 10 A | | | | |
| 30 | 40.5 | .313 | 82.0 | N.E. | 110 | 4.5 | 30 | 2 P | | | | |
| 31 | 41.5 | .329 | 81.0 | N. | 74 | 1.0 | 14 | 8 A | | | | |

** Rain or melted snow at base of tower. *Included in following day.

## REMARKS

The weather during March was in many respects the most wintry of the season. The snowfall was exceptionally large and traffic was blocked to a considerable extent. The temperature was much below the normal, in fact, the mean for the month was about average midwinter temperature. The total snowfall for the season was 56 inches—an unusually large amount. Shortly after the equinoctial date the weather turned warmer and by the end of the month nearly all the snow in this vicinity had disappeared without causing extremely high water. The total number of days of sleighing during the winter was about one hundred.

The mean barometer was comparatively low, and was smaller than usual. The maximum and minimum barometer up to the 25th are taken from barograph readings, after that the Draper barometer records are used.

The total wind movement was slightly below the normal although several high daily records were made. No extremely high velocities were recorded on the pressure chart. Up to the last week nearly all the wind was from the westerly points of the compass.

The mean hourly temperature was more than seven degrees below the normal, making it the coldest March since this station was established. Other low March records taken from Professor Snell's records at Amherst College are, 1888, 26.8; 1887, 26.4; 1863, 26.1; 1856, 25.9; 1843, 24.5. These however are taken from maximum and minimum daily readings. The range of temperature was unusually large owing to the high temperature at the close of the month.

The mean dewpoint was low owing to the low temperature of the month.

The total precipitation was nearly normal and nearly all of it occurred as snow. The snowfall of 22 inches was the largest of any month of the winter. The amount of sunshine was considerably more than the normal.

J. E. OSTRANDER, Meteorologist.

DAVID POTTER, Observer.

BULLETIN No. 328. APRIL, 1916

# Meteorological Observations

AT THE

# MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.

*Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.*

*Height of Wind Instruments 72 ft.*

## MONTHLY SUMMARY.

**Pressure.** In inches.

| | |
|---|---|
| Maximum reduced to freezing | 29.97, 16th, 9 A |
| Minimum reduced to freezing | 29.03, 8th, 11 P |
| Reduced† maximum reading | 30.27, 16th, 9 A |
| Reduced† minimum reading | 29.34, 8th, 11 P |
| Mean semi-daily reduced | 29.917 |
| Monthly range | 0.94 |

***Air Temperature.** In Degrees Fahr.

| | |
|---|---|
| Highest | 73.5, 30th, 3 P |
| Lowest | 28.0, 3d, 6:30 A |
| Mean hourly | 43.9 |
| Mean of means of max. and min. | 44.6 |
| Mean sensible (wet bulb) | 40.5 |
| Monthly range | 45.5 |
| Highest mean daily | 56.3, 30th |
| Lowest mean daily | 32.5 9th |
| Mean maximum | 54.1 |
| Mean minimum | 35.1 |
| Mean daily range | 19.0 |
| Greatest daily range | 40.0, 16th |
| Least daily range | 3.5, 4th |

**Humidity.**

| | |
|---|---|
| Mean dew point | 37.4 |
| Mean force of vapor | .283 |
| Mean relative humidity | 81.2 |

**Precipitation.** In inches.

| | |
|---|---|
| Total precipitation | 3.69 |
| Number of days on which .01 inch or more rain fell | 11 |
| Total snow in inches | 4¾ |

* Temperature in ground shelter.

† Reduced to freezing and sea-level.

**Wind.**

| | |
|---|---|
| Total movement | 4836 m |
| Greatest daily movement | 424m, 15th |
| Least daily movement | 38m, 20th |
| Mean daily movement | 161 m |
| Mean hourly velocity | 6.7 m |

Maximum pressure per square foot, 18.5 lbs = 61 m per hour, 15th, 10 A, N.

Maximum velocity for 5 minutes, 48m per hour, 15th, 10 A, N.

Prevailing direction, West.

Summary.

| | |
|---|---|
| Northeast | 17 per cent |
| East | 13 " " |
| West | 20 " " |
| Northwest | 10 " " |
| Other directions | 40 " " |

**Weather.**

| | |
|---|---|
| Mean cloudiness observed | 65 per cent |
| Total cloudiness recorded by the Sun Thermometer | 279 hours = 69 per cent |
| Number of clear days | 5 |
| Number of fair days | 8 |
| Number of cloudy days | 17 |

**Bright Sunshine.**

Number hours recorded, 123 hrs, = 31 per cent

**Rain,** 1st, 4th, 6th, 12th, 13th, 14th, 17th, 21st, 22d, 23d, 24th, 26th, 27th, 28th.

**Snow,** 4th, 6th, 8th, 9th, 14th.

**Hail,** 9th.

**Frosts,** after the 15th—28th.

**Gales,** 35 or more miles per hour: 35m, 2d, N,W.; 39m, 7th, W.N.W.; 40m, 9th, N.; 35m, 12th, N.; 61m, 15th, N.; 43m, 18th, N.W.; 39m, 19th, N.W.

# DAILY SUMMARY.

| Day. | Barometer Reduced to Sea Level. |  |  | Temperature. Ground Shelter. |  |  |  |  |  |  | No. Hours of Bright Sunshine. |
|---|---|---|---|---|---|---|---|---|---|---|---|
|  | Maximun. | Minimum. | Mean. Semi-daily. | Maximum | Time. | Minimum. | Time. | Mean of Max. and Min. | Mean Hourly Draper. | Mean Sensible Wet Bulb. |  |
| 1 | 30.13 | 29.79 | 29.913 | 65.0 | 1:30 P | 36.0 | 6:30 A | 50.5 | 48.7 | 43.7 | 6.6 |
| 2 | 30.09 | 29.79 | 29.924 | 49.0 | 5 P | 35.5 | 12 P | 42.3 | 43.8 | 40.0 | 4.1 |
| 3 | 30.22 | 30.09 | 30.208 | 55.5 | 4:30 P | 28.0 | 6:30 A | 41.7 | 39.9 | 33.0 | 8.7 |
| 4 | 30.23 | 29.98 | 30.145 | 37.0 | 1 A | 33.5 | 6 A | 35.3 | 34.0 | 32.3 | 0.0 |
| 5 | 30.04 | 29.87 | 29.973 | 54.0 | 2 P | 32.5 | 0 A | 43.3 | 42.4 | 38.7 | 8.6 |
| 6 | 30.04 | 29.82 | 29.939 | 58.5 | 3 P | 29.5 | 3:30 A | 44.0 | 42.2 | 39.0 | 6.3 |
| 7 | 30.11 | 29.87 | 29.982 | 45.5 | 3 P | 31.5 | 12 P | 38.5 | 37.1 | 33.0 | 6.3 |
| 8 | 30.08 | 29.34 | 29.719 | 43.0 | 2 P | 28.5 | 5 A | 35.7 | 34.1 | 31.3 | 0.0 |
| 9 | 29.64 | 29.38 | 29.472 | 37.5 | 3:30 P | 29.0 | 5 A | 33.3 | 32.5 | 31.3 | 1.4 |
| 10 | 30.12 | 29.64 | 30.010 | 50.0 | 3 P | 29.5 | 6 A | 39.7 | 39.3 | 35.7 | 9.2 |
| 11 | 30.24 | 29.91 | 30.108 | 60.0 | 3 P | 28.5 | 5:30 A | 44.3 | 45.1 | 40.0 | 9.2 |
| 12 | 30.06 | 29.82 | 29.935 | 54.0 | 4:30 P | 39.5 | 8 A | 46.7 | 45.1 | 40.7 | 1.0 |
| 13 | 30.06 | 29.87 | 29.945 | 52.5 | 1 P | 35.0 | 6 A | 43.7 | 43.1 | 40.3 | 0.1 |
| 14 | 29.87 | 29.36 | 29.573 | 39.0 | 0 A | 31.5 | 12 P | 35.3 | 35.0 | 34.0 | 0.0 |
| 15 | 30.17 | 29.60 | 30.004 | 54.0 | 4:30 P | 31.5 | 0 A | 42.7 | 43.1 | 39.3 | 10.8 |
| 16 | 30.27 | 30.08 | 30.181 | 70.0 | 3:30 P | 30.0 | 5:30 A | 50.0 | 50.2 | 46.3 | 10.0 |
| 17 | 30.08 | 29.71 | 29.831 | 68.5 | 12 M | 40.0 | 4 A | 54.3 | 48.5 | 46.7 | 1.3 |
| 18 | 29.71 | 29.59 | 29.662 | 46.5 | 3:30 P | 38.5 | 5 A | 42.3 | 42.8 | 40.3 | 0.0 |
| 19 | 30.05 | 29.70 | 29.946 | 61.5 | 4 P | 36.0 | 6 A | 48.7 | 47.2 | 42.7 | 10.9 |
| 20 | 30.10 | 29.93 | 30.035 | 64.0 | 4 P | 38.0 | 2:30 A | 51.0 | 49.8 | 45.3 | 2.9 |
| 21 | 29.97 | 29.82 | 29.881 | 59.5 | 3 P | 44.5 | 6 A | 52.0 | 50.2 | 46.3 | 1.6 |
| 22 | 29.84 | 29.70 | 29.759 | 48.0 | 11:30 P | 39.5 | 12 P | 43.7 | 44.4 | 40.7 | 0.0 |
| 23 | 29.70 | 29.68 | 29.683 | 43.0 | 8 P | 39.0 | 4 A | 41.0 | 41.3 | 40.3 | 0.0 |
| 24 | 29.92 | 29.69 | 29.840 | 51.5 | 3 P | 41.0 | 3 A | 46.3 | 45.0 | 43.0 | 0.5 |
| 25 | 29.89 | 29.73 | 29.841 | 63.0 | 2 P | 35.0 | 5:30 A | 49.0 | 48.5 | 43.7 | 6.3 |
| 26 | 29.94 | 29.76 | 29.871 | 53.0 | 4 P | 40.5 | 6 A | 46.7 | 46.0 | 43.7 | 0.6 |
| 27 | 29.99 | 29.95 | 29.986 | 54.0 | 12 M | 39.0 | 4 A | 46.5 | 48.2 | 46.0 | 0.2 |
| 28 | 30.05 | 29.98 | 30.018 | 43.5 | 3:30 P | 37.5 | 8 A | 40.5 | 40.5 | 37.5 | 0.0 |
| 29 | 30.09 | 29.95 | 30.058 | 69.5 | 3 P | 34.5 | 5 A | 52.0 | 53.2 | 50.0 | 8.1 |
| 30 | 30.10 | 29.95 | 30.071 | 73.5 | 3 P | 41.0 | 6 A | 57.3 | 56.3 | 51.0 | 8.3 |

# DAILY SUMMARY.

| Day. | Humidity. | | | Wind. | | | | | Precipitation. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Total in Inches. | |
| | Mean Dew Point. | Mean Force vapor. | Mean Relative Humidity. | Prevailing Direction. | Total Movement in Miles. | Maximum Pressure Per Square Ft | Miles per Hour. | Time. | Beginning. | Ending. | Rain.** | Snow. |
| 1 | 39.5 | .313 | 80.5 | S. | 138 | 5.0 | 32 | 8 P | 11 P | | T | |
| 2 | 36.5 | .274 | 79.0 | W.N.W. | 264 | 6.0 | 35 | 3 P | | | | |
| 3 | 26.5 | .218 | 67.0 | W.S.W. | 85 | 2.0 | 20 | 7 P | | | | |
| 4 | 30.0 | .193 | 85.0 | E. | 106 | 1.0 | 14 | 12 P | 2 A | 3 P | .11 | T |
| 5 | 35.0 | .258 | 82.0 | N.W. | 158 | 3.0 | 24 | 2 P | | | | |
| 6 | 33.5 | .271 | 78.0 | S.W. | 115 | 3.5 | 26 | 6 P | 8 P | 11 P | .06 | T |
| 7 | 29.0 | .186 | 75.5 | W. | 298 | 7.5 | 39 | 2 P | | | | |
| 8 | 29.0 | .185 | 85.0 | E. | 168 | 2.0 | 20 | 5 P | 8 P | 12 P | .24 | 2 |
| 9 | 30.0 | .180 | 92.5 | N.N.W. | 228 | 8.0 | 40 | 1 P | 0 A | 10 P | .27 | 2¾ |
| 10 | 31.5 | .236 | 75.0 | W. | 204 | 4.5 | 30 | 4 P | | | | |
| 11 | 32.0 | .309 | 59.5 | S.S.W. | 285 | 5.0 | 32 | 5 P | | | | |
| 12 | 38.0 | .277 | 83.5 | W. | 245 | 6.0 | 35 | 10 A | 1 A | 7 A | .04 | |
| 13 | 38.5 | .264 | 88.0 | W. | 55 | 1.5 | 17 | 4 P | 11 A | 7 P | .03 | |
| 14 | 33.0 | .202 | 93.0 | N. | 67 | 3.0 | 24 | 11 P | 6 A | 11 P | .76 | T |
| 15 | 34.0 | .279 | 69.5 | N.N.W. | 424 | 18.5 | 61 | 10 A | | | | |
| 16 | 45.0 | .333 | 90.0 | S.W. | 78 | 2.0 | 20 | 6 P | | | | |
| 17 | 45.5 | .336 | 91.5 | W. | 165 | 1.5 | 17 | 11 A | 11 A | 9 P | .06 | |
| 18 | 37.5 | .276 | 79.5 | W. | 282 | 9.0 | 43 | 2 P | | | | |
| 19 | 37.5 | .322 | 70.0 | N.W. | 369 | 7.5 | 39 | 1 P | | | | |
| 20 | 42.5 | .328 | 86.0 | W.S.W. | 38 | 1.5 | 17 | 5 P | | | | |
| 21 | 43.5 | .340 | 83.0 | N.W. | 69 | 0.5 | 10 | 4 P | 5 A | 9 A | .03 | |
| 22 | 37.0 | .289 | 75.0 | N.E. | 89 | 1.0 | 14 | 10 A | 6 A | 12 P | .20 | |
| 23 | 38.5 | .263 | 90.0 | N.E. | 128 | 1.5 | 17 | 2 P | 0 A | 11 P | 1.29 | |
| 24 | 41.0 | .295 | 86.5 | N.N.E. | 201 | 2.5 | 22 | 2 P | 8 A | 11 A | .07 | |
| 25 | 41.0 | .313 | 82.0 | N.E. | 67 | 2.5 | 22 | 4 P | | | | |
| 26 | 41.5 | .309 | 84.0 | E. | 87 | 0.5 | 10 | 2 P | 8 A | 9 A | T | |
| 27 | 43.0 | .353 | 79.5 | N.E. | 92 | 1.5 | 17 | 2 P | 11 P | 12 P | T | |
| 28 | 34.5 | .240 | 85.0 | N.E. | 149 | 2.5 | 22 | 10 A | 0 A | 9 P | .53 | |
| 29 | 47.0 | .417 | 79.0 | N. | 87 | 2.5 | 22 | 11 A | | | | |
| 30 | 48.5 | .419 | 82.0 | E | 95 | 2.5 | 22 | 2 P | | | | |

**Rain or melted snow at base of tower. *Included in following day.

## REMARKS

The weather during the month was considerably colder than usual, following the wintry conditions that prevailed in March. Much cloudiness, a considerable snowstorm, and a rather large precipitation, all tended to retard the season's progress, so that at the close of the month the seasonal advancement was about two weeks behind normal conditions. The mean hourly temperature was above fifty degrees on only four days of the month.

Comparing the records of the several weather elements with the normals at this station, tha following features are noted: The mean barometer was unusually low and the range considerably less than usual. The small fluctuations in pressure resulted in a total wind movement about ten per cent less than the normal. The wind directions were more variable than usual.

The mean temperature was more than two degrees below the normal and the monthly range the smallest for April since this station was established. The minimum temperature was more than six degrees higher than the normal for this feature. Only a trace of frost was noted after the middle of the month.

The mean dewpoint and relative humidity were both unusually high, owing to the many days on which precipitation occurred.

The total precipitation was about twenty per cent more than normal and included a snowstorm of nearly five inches.

The amount of sunshine was nearly one hundred hours less than usual.

J. E. OSTRANDER, Meteorologist.

DAVID POTTER, Observer.

BULLETIN No. 329. MAY, 1916

# Meteorological Observations

AT THE

# MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.
*Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.*
*Height of Wind Instruments 72 ft.*

## MONTHLY SUMMARY.

### Pressure. In inches.

| | |
|---|---|
| Maximum reduced to freezing, | 30.02, 14th, 8 A |
| Minimum reduced to freezing, | 28.92, 17th, 3 P |
| Reduced† maximum reading, | 30.32, 14th, 8 A |
| Reduced† minimum reading, | 29.22, 17th, 3 P |
| Mean semi-daily reduced | 29.907 |
| Monthly range | 1.10 |

### *Air Temperature. In Degrees Fahr.

| | |
|---|---|
| Highest | 81.5, 29th, 2:30 P |
| Lowest | 36.0, 10th, 4:30 A |
| Mean hourly | 55.9 |
| Mean of means of max. and min. | 56.2 |
| Mean sensible (wet bulb) | 50.4 |
| Monthly range | 45.5 |
| Highest mean daily | 67.4, 29th |
| Lowest mean daily | 46.8 18th, 23d |
| Mean maximum | 66.7 |
| Mean minimum | 45.7 |
| Mean daily range | 21.0 |
| Greatest daily range | 36.5, 21st |
| Least daily range | 5.0, 23d |

### Humidity.

| | |
|---|---|
| Mean dew point | 45.1 |
| Mean force of vapor | .448 |
| Mean relative humidity | 71.9 |

### Precipitation. In inches.

| | |
|---|---|
| Total precipitation | 3.21 |
| Number of days on which .01 inch or more rain fell | 12 |

### Wind.

| | |
|---|---|
| Total movement | 4893 m |
| Greatest daily movement | 449m, 11th |
| Least daily movement | 45m, 16th |
| Mean daily movement | 158 m |
| Mean hourly velocity | 6.6 m |

Maximum pressure per square foot, 19.0 lbs = 62 m per hour, 12th, 1 A, W.N.W.

Maximum velocity for 5 minutes, 36m per hour, 11th, 1 P, S.S.W.

Prevailing direction, West Southwest.

Summary.

| | |
|---|---|
| North Northwest | 10 per cent |
| South Southwest | 26 " " |
| West | 19 " " |
| West Northwest | 13 " " |
| Other directions | 32 " " |

### Weather.

| | |
|---|---|
| Mean cloudiness observed | 53 per cent |
| Total cloudiness recorded by the Sun Thermometer | 272 hours = 60 per cent |
| Number of clear days | 4 |
| Number of fair days | 14 |
| Number of cloudy days | 13 |

### Bright Sunshine.

Number hours recorded, 191 hrs, = 40 per cent

**Rain.** 2d, 4th, 6th, 7th, 8th, 15th, 16th, 17th, 23d, 24th, 27th, 28th, 29th, 30th.

**Thunder and Lightning.** 4th, 8th, 28th, 30th.

**Frosts.** 19th.

**Gales.** 35 or more miles per hour: 35m, 2d, N.; 47m, 8th, S.S.W.; 40m, 9th, W.S.W.; 61m, 11th, W.; 62m, 12th, W.N.W.; 42m, 17th, N.W.; 35m, 25th, W.N.W.

---

* Temperature in ground shelter.

† Reduced to freezing and sea-level.

# DAILY SUMMARY.

| Day. | Barometer Reduced to Sea Level. | | | Temperature. Ground Shelter. | | | | | | | No. Hours of Bright Sunshine. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Maximun. | Minimum. | Mean. Semi-daily. | Maximum | Time. | Minimum. | Time. | Mean of Max. and Min. | Mean Hourly Draper. | Mean Sensible Wet Bulb. | |
| 1 | 30.09 | 29.89 | 30.008 | 69.5 | 3 P | 39.5 | 6 A | 54.5 | 53.3 | 46.3 | 7.3 |
| 2 | 30.03 | 29.84 | 29.934 | 66.5 | 3 P | 44.0 | 4 A | 55.3 | 54.3 | 48.7 | 6.6 |
| 3 | 30.07 | 29 69 | 29.885 | 62 5 | 1:30 P | 39 0 | 4 A | 50.7 | 52.0 | 47.3 | 0.7 |
| 4 | 29.93 | 29 67 | 29 892 | 66.0 | 3 P | 46.5 | 12 P | 56.3 | 55.3 | 49.5 | 9.1 |
| 5 | 29.93 | 29.80 | 29 843 | 68 5 | 4 P | 42.0 | 5 A | 55.3 | 55.1 | 50.0 | 3.2 |
| 6 | 29.85 | 29 74 | 29.816 | 74.5 | 5 P | 51.0 | 3 A | 62.7 | 60.3 | 54.3 | 7.9 |
| 7 | 29.79 | 29 65 | 29.751 | 64 0 | 4:30 P | 51.0 | 4:30 A | 57.5 | 56.5 | 51.3 | 0.1 |
| 8 | 29 88 | 29 51 | 29.728 | 74.0 | 2:30 P | 49.0 | 6 A | 61.5 | 59.8 | 46.3 | 5.9 |
| 9 | 29 90 | 29 55 | 29.731 | 59.5 | 0 A | 42.0 | 12 P | 50.7 | 52.5 | 45.7 | 4.0 |
| 10 | 30.04 | 29 65 | 29.888 | 71.5 | 3:30 P | 36.0 | 4:30 A | 53.7 | 52.1 | 45.3 | 0.8 |
| 11 | 29.76 | 29.48 | 29 585 | 74.5 | 3 P | 50.0 | 1 A | 62 3 | 64.9 | 59.5 | 9.8 |
| 12 | 30.20 | 29 76 | 30.050 | 60 0 | 4:30 P | 45.0 | 7 A | 52.5 | 51.9 | 44.3 | 9 9 |
| 13 | 30.27 | 30.12 | 30 216 | 67.0 | 5 P | 41.5 | 5:30 A | 54.3 | 55.0 | 47.7 | 11.1 |
| 14 | 30 32 | 30 21 | 30 266 | 64.0 | 3:30 P | 36.5 | 5 A | 50.3 | 53.4 | 48.7 | 5.0 |
| 15 | 30.23 | 30 10 | 30.131 | 54.5 | 6 P | 45.0 | 3 A | 49 7 | 49.6 | 43 5 | 0.0 |
| 16 | 30.10 | 29.74 | 29 939 | 54.0 | 2 P | 45.0 | 10:30 P | 49.5 | 49.1 | 43.7 | 0.0 |
| 17 | 29.74 | 29.22 | 29.407 | 51.5 | 3 P | 46.0 | 12 P | 48.7 | 48.3 | 46.3 | 0.0 |
| 18 | 29.84 | 29.48 | 29 690 | 51.5 | 4 P | 41.5 | 12 P | 46.5 | 46 8 | 40.7 | 1.2 |
| 19 | 30.03 | 29.84 | 29.959 | 63.5 | 5 P | 37 0 | 4:30 A | 50.3 | 50.9 | 46 3 | 10.4 |
| 20 | 30.05 | 29.98 | 30.030 | 64.0 | 2 P | 46 0 | 12 P | 55.0 | 53.5 | 48.7 | 7.9 |
| 21 | 30.13 | 30 01 | 30 042 | 76.0 | 3:30 P | 39 5 | 4 A | 57.7 | 59.0 | 53.3 | 11.7 |
| 22 | 30.23 | 30.13 | 30 210 | 71.0 | 2 P | 42.5 | 4:30 A | 56 7 | 55.8 | 49.3 | 8.6 |
| 23 | 30.18 | 30.06 | 30.114 | 50.0 | 4 P | 45 0 | 3 A | 47 5 | 46.8 | 45 7 | 0 0 |
| 24 | 30.06 | 29.85 | 29.960 | 76.0 | 4:30 P | 49.0 | 0 A | 62.6 | 60.6 | 56.3 | 7 6 |
| 25 | 29 85 | 29.62 | 29 730 | 80.0 | 2:30 P | 52 0 | 5 A | 66.0 | 65.2 | 60 0 | 11.6 |
| 26 | 29 95 | 29.71 | 29.865 | 73 0 | 4 P | 53.5 | 12 P | 63.3 | 63.0 | 57.3 | 12.1 |
| 27 | 30.08 | 29.95 | 30 041 | 74 0 | 1:30 P | 44.0 | 5 A | 59 0 | 60.2 | 56.3 | 7.9 |
| 28 | 30 07 | 29.88 | 29.968 | 62.5 | 5 P | 52.5 | 6 A | 57.5 | 57.4 | 54.7 | 0 0 |
| 29 | 29.88 | 29 77 | 29 845 | 81.5 | 2:30 P | 55 0 | 2 A | 68.3 | 67.4 | 60.3 | 7.9 |
| 30 | 29.77 | 29.50 | 29.650 | 70.5 | 4:30 P | 58 5 | 12 P | 64 5 | 63.9 | 59.7 | 0.5 |
| 31 | 30.01 | 29.62 | 29.863 | 71.0 | 4 P | 52.5 | 12 P | 61 7 | 60.8 | 54.5 | 12.1 |

# DAILY SUMMARY.

| Day. | Humidity. | | | Wind. | | | | | Precipitation. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Mean Dew Point. | Mean Force vapor. | Mean Relative Humidity. | Prevailing Direction. | Total Movement in Miles. | Maximum Pressure Per Square Ft | Miles per Hour. | Time. | Beginning. | Ending. | Total in Inches. | |
| | | | | | | | | | | | Rain.** | Snow. |
| 1 | 41.5 | .374 | 69.5 | S.S.W. | 147 | 2.5 | 22 | 4 P | | | | |
| 2 | 46.0 | .392 | 80.0 | W. | 184 | 6.0 | 35 | 11 A | 8 A | | T | |
| 3 | 44.0 | .380 | 75.0 | W. | 101 | 1.5 | 17 | 8 P | | | | |
| 4 | 47.0 | .402 | 78.5 | W.N.W. | 180 | 3.0 | 24 | 1 P | 1 A | 6 A | .04 | |
| 5 | 45.5 | .439 | 71.0 | W.S.W. | 51 | 0.5 | 10 | 6 P | | | | |
| 6 | 52.0 | .478 | 83.5 | W.N.W. | 132 | 2.0 | 20 | 12 M | 0 A | 7 A | .22 | |
| 7 | 47.5 | .453 | 72.0 | S.S.W. | 123 | 2.0 | 20 | 2 P | 8 A | 12 P | .19 | |
| 8 | 47.5 | .461 | 70.0 | S.S.W. | 188 | 11.0 | 47 | 2 P | 0 A | 7 P | .12 | |
| 9 | 39.5 | .407 | 56.0 | N.W. | 316 | 8.0 | 40 | 6 A | | | | |
| 10 | 40.5 | .371 | 66.5 | S.S.W. | 219 | 5.5 | 33 | 6 P | | | | |
| 11 | 53.0 | .680 | 61.0 | W. | 449 | 18.5 | 61 | 3 P | | | | |
| 12 | 39.5 | .345 | 70.5 | W.N.W. | 446 | 19.0 | 62 | 1 A | | | | |
| 13 | 40.5 | .440 | 57.0 | W.S.W. | 165 | 5.0 | 32 | 4 P | | | | |
| 14 | 42.0 | .424 | 61.0 | W. | 113 | 1.5 | 17 | 8 P | | | | |
| 15 | 37.0 | .359 | 61.0 | S. | 64 | 0.5 | 10 | 10 P | 1 A | 12 P | .23 | |
| 16 | 40.0 | .336 | 71.5 | E.N.E. | 45 | 0.5 | 10 | 11 P | 0 A | 12 P | .96 | |
| 17 | 44.0 | .345 | 83.5 | N.N.W. | 227 | 9.0 | 42 | 4 P | 0 A | 3 P | .73 | |
| 18 | 34.0 | .310 | 62.0 | W. | 265 | 2.5 | 22 | 10 A | | | | |
| 19 | 39.5 | .392 | 62.0 | W.N.W. | 120 | 2.0 | 20 | 2 P | | | | |
| 20 | 44.5 | .407 | 74.0 | N.N.W. | 131 | 3.5 | 26 | 3 P | | | | |
| 21 | 47.5 | .527 | 61.5 | N. | 141 | 5.5 | 33 | 8 A | | | | |
| 22 | 43.0 | .425 | 76.5 | S.S.W. | 187 | 4.0 | 28 | 3 P | | | | |
| 23 | 47.5 | .331 | 88.5 | S.S.W. | 182 | 2.0 | 20 | 6 A | 1 A | 12 P | .44 | |
| 24 | 57.0 | .544 | 69.5 | S.S.W. | 65 | 1.0 | 14 | 3 P | 0 A | 6 A | .10 | |
| 25 | 57.5 | .618 | 77.5 | W. | 229 | 6.0 | 35 | 4 P | | | | |
| 26 | 54.0 | .570 | 73.0 | N. | 145 | 3.0 | 24 | 10 A | | | | |
| 27 | 53.0 | .532 | 76.5 | E. | 114 | 1.5 | 17 | 6 P | 3 P | | T | |
| 28 | 54.0 | .465 | 88.5 | S. | 75 | 0.0 | — | — | 1 A | 12 P | .06 | |
| 29 | 57.0 | .622 | 75.0 | S.W. | 50 | 0.0 | — | — | 0 A | 7 A | .03 | |
| 30 | 58.5 | .565 | 84.5 | S.S.W. | 188 | 2.0 | 20 | 3 P | 1 A | 7 P | .09 | |
| 31 | 50.5 | .512 | 71.5 | N.N.W. | 278 | 3.5 | 26 | 8 P | | | | |

**Rain or melted snow at base of tower. *Included in following day.

## REMARKS

The weather during the month was considerably cooler than usual and the backward condition of the season which was noted at the beginning of the month was not materially changed. Deficiency in sunshine, combined with relatively low temperatures, materially retarded the season's progress.

The records of the various weather elements show the following features of interest: The mean barometer was the lowest for fifteen years and the range more than twenty per cent greater than usual. Notwithstanding the rather large fluctuations in pressure the total wind movement was only about the normal amount. Winds from the southwest quadrant predominated.

The mean hourly temperature was slightly below the normal. The range of temperature was unusually small, due to a low maximum and a high minimum. The maximum reading was more than five degrees lower than usual and the minimum was a like amount higher than usual. Owing to the high minimum records there was no frost excepting on a single date and that was scarcely more than a trace.

The mean dew point was slightly lower than usual, while the relative humidity was nearly normal.

The total precipitation was about half an inch less than the normal. There was one heavy rainfall about the middle of the month, when sixty per cent of the total for the month was recorded.

The amount of bright sunshine was about eighty per cent of the normal.

J. E. OSTRANDER, Meteorologist.

DAVID POTTER, Observer.

BULLETIN No. 330. JUNE, 1916

# Meteorological Observations
AT THE
# MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.
*Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.*
*Height of Wind Instruments 72 ft.*

## MONTHLY SUMMARY.

### **Pressure.** In inches.

| | |
|---|---|
| Maximum reduced to freezing | 29.83, 16th, 11 A |
| Minimum reduced to freezing | 29.31, 3d, 12 P |
| Reduced† maximum reading | 30.13, 16th, 11 A |
| Reduced† minimum reading | 29.61, 3d, 12 P |
| Mean semi-daily reduced | 29.945 |
| Monthly range | 0.52 |

### ***Air Temperature.** In Degrees Fahr.

| | |
|---|---|
| Highest | 84.0, 28th, 3 P |
| Lowest | 40.0, 2d, 4:30 A |
| Mean hourly | 61.1 |
| Mean of means of max. and min. | 61.3 |
| Mean sensible (wet bulb) | 57.0 |
| Monthly range | 44.0 |
| Highest mean daily | 72.0, 28th |
| Lowest mean daily | 49.8 10th |
| Mean maximum | 71.3 |
| Mean minimum | 51.2 |
| Mean daily range | 20.1 |
| Greatest daily range | 40.5, 2d |
| Least daily range | 5.0, 9th |

### **Humidity.**

| | |
|---|---|
| Mean dew point | 53.3 |
| Mean force of vapor | 0.556 |
| Mean relative humidity | 75.7 |

### **Precipitation.** In inches.

| | |
|---|---|
| Total precipitation | 5.34 |
| Number of days on which .01 inch or more rain fell | 13.0 |

### **Wind.**

| | |
|---|---|
| Total movement | 3226 m |
| Greatest daily movement | 229m, 22d |
| Least daily movement | 23m, 16th |
| Mean daily movement | 108 m |
| Mean hourly velocity | 4.5 m |

Maximum pressure per square foot, 7.0 lbs = 37 m per hour, 22d, 11 A, N.W.

Maximum velocity for 5 minutes, 24m per hour, 22d, 12 M, N.W.

Prevailing direction, Northeast.

#### Summary.

| | |
|---|---|
| North Northwest | 10 per cent |
| North Northeast | 10 " " |
| South | 17 " " |
| Northeast | 10 " " |
| West Northwest | 10 " " |
| Other directions | 43 " " |

### **Weather.**

| | |
|---|---|
| Mean cloudiness observed | 62 per cent |
| Total cloudiness recorded by the Sun Thermometer | 301 hours = 66 per cent |
| Number of clear days | 4 |
| Number of fair days | 10 |
| Number of cloudy days | 16 |

### **Bright Sunshine.**

Number hours recorded, 156 hrs, = 34 per cent

**Rain,** 3d, 5th, 7th, 8th, 9th, 11th, 12th, 13th, 16th, 17th, 18th, 19th, 21st, 25th.

**Thunder and Lightning,** 1st, 5th, 12th, 13th, 18th.

**Frosts,**

**Gales,** 35 or more miles per hour. 36m, 4th, N.W.; 37m, 22d, N.W.

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* Temperature in ground shelter.

† Reduced to freezing and sea-level.

# DAILY SUMMARY.

| Day. | Barometer Reduced to Sea Level. | | | Temperature. Ground Shelter. | | | | | | | No. Hours of Bright Sunshine. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Maximun. | Minimum. | Mean. Semi-daily. | Maximum | Time. | Minimum. | Time. | Mean of Max. and Min. | Mean Hourly Draper. | Mean Sensible Wet Bulb. | |
| 1 | 30.08 | 30.01 | 30.057 | 76.0 | 4:30 P | 41.5 | 5 A | 58.7 | 60.2 | 51.7 | 13.5 |
| 2 | 30.11 | 29.92 | 30.013 | 80.5 | 3:30 P | 40.0 | 4:30 A | 60.3 | 63.0 | 53.5 | 13.6 |
| 3 | 29.94 | 29.61 | 29.748 | 67.0 | 1 P | 51.5 | 4:30 A | 59.3 | 58.1 | 54.0 | 0.0 |
| 4 | 29.77 | 29.61 | 29.701 | 72.0 | 3 P | 50.5 | 5:30 A | 61.3 | 61.5 | 55.3 | 11.7 |
| 5 | 29.81 | 29.73 | 29.773 | 73.0 | 11 A | 49.0 | 5 A | 61.0 | 57.5 | 57.7 | 3.5 |
| 6 | 29.95 | 29.81 | 29.896 | 76.0 | 2:30 P | 50.0 | 6 A | 63.0 | 61.2 | 57.0 | 7.3 |
| 7 | 29.96 | 29.92 | 29.937 | 67.0 | 2:30 P | 51.5 | 3:30 A | 59.3 | 60.5 | 56.0 | 0.8 |
| 8 | 30.07 | 29.94 | 30.023 | 60.0 | 3 P | 54.5 | 1 A | 57.3 | 56.7 | 54.5 | 0.0 |
| 9 | 30.10 | 30.05 | 30.101 | 54.5 | 11 A | 49.5 | 5:30 A | 52.0 | 50.6 | 49.5 | 0.0 |
| 10 | 30.09 | 30.01 | 30.079 | 54.0 | 3 P | 46.5 | 2 A | 50.3 | 49.8 | 49.3 | 0.0 |
| 11 | 30.03 | 29.96 | 30.003 | 60.0 | 1 P | 50.0 | 2 A | 55.0 | 54.8 | 52.7 | 0.0 |
| 12 | 29.96 | 29.91 | 29.964 | 74.5 | 6 P | 55.0 | 5 A | 64.7 | 62.6 | 58.5 | 5.5 |
| 13 | 29.98 | 29.87 | 29.960 | 78.5 | 1:30 P | 50.0 | 5 A | 64.3 | 63.7 | 58.3 | 8.8 |
| 14 | 30.06 | 29.98 | 30.025 | 73.5 | 4:30 P | 52.5 | 6 A | 63.0 | 63.0 | 57.5 | 6.0 |
| 15 | 30.09 | 30.02 | 30.071 | 63.0 | 4 P | 54.0 | 12 P | 58.5 | 58.3 | 54.3 | 0.0 |
| 16 | 30.13 | 29.99 | 30.070 | 65.0 | 4:30 P | 52.0 | 6 A | 58.5 | 57.5 | 55.7 | 0.0 |
| 17 | 29.99 | 29.83 | 29.862 | 69.0 | 4 P | 59.0 | 4 A | 64.0 | 64.2 | 62.5 | 0.0 |
| 18 | 29.86 | 29.74 | 29.830 | 77.0 | 1:30 P | 60.0 | 12 P | 68.5 | 65.9 | 57.7 | 4.7 |
| 19 | 29.85 | 29.68 | 29.762 | 67.5 | 11:30 A | 51.5 | 4:30 A | 59.5 | 60.4 | 59.5 | 2.2 |
| 20 | 29.93 | 29.68 | 29.821 | 65.0 | 2:30 P | 47.0 | 12 P | 56.0 | 57.6 | 55.3 | 4.3 |
| 21 | 29.96 | 29.87 | 29.915 | 72.0 | 1:30 P | 43.0 | 5:30 A | 57.5 | 57.3 | 54.7 | 7.1 |
| 22 | 29.97 | 29.89 | 29.918 | 68.5 | 1:30 P | 46.5 | 5 A | 57.5 | 59.0 | 53.0 | 8.3 |
| 23 | 29.95 | 29.90 | 29.932 | 75.5 | 1 P | 44.0 | 3 A | 59.7 | 61.9 | 56.7 | 8.0 |
| 24 | 30.01 | 29.94 | 29.978 | 78.5 | 3 P | 46.5 | 3:30 A | 62.5 | 62.7 | 59.7 | 9.2 |
| 25 | 29.98 | 29.91 | 29.959 | 64.5 | 10 A | 57.5 | 5 A | 61.0 | 64.5 | 61.5 | 0.0 |
| 26 | 30.02 | 29.95 | 30.013 | 81.5 | 4:30 P | 56.5 | 5 A | 69.0 | 68.5 | 63.7 | 12.8 |
| 27 | 30.04 | 29.95 | 30.012 | 82.5 | 3 P | 56.5 | 5 A | 69.5 | 68.5 | 63.0 | 6.3 |
| 28 | 29.98 | 29.90 | 29.947 | 84.0 | 3 P | 65.0 | 5 A | 74.5 | 72.0 | 66.0 | 8.5 |
| 29 | 30.02 | 29.93 | 29.973 | 79.5 | 1:30 P | 53.5 | 5 A | 66.5 | 66.7 | 59.7 | 7.5 |
| 30 | 30.05 | 29.96 | 30.021 | 79.5 | 4 P | 51.5 | 5 A | 65.5 | 66.0 | 58.7 | 14.5 |

# DAILY SUMMARY.

| Day. | Humidity. | | | Wind. | | | | | Precipitation. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Total in Inches. | |
| | Mean Dew Point. | Mean Force vapor. | Mean Relative Humidity. | Prevailing Direction. | Total Movement in Miles. | Maximum Pressure Per Square Ft | Miles per Hour. | Time. | Beginning. | Ending. | Rain.** | Snow. |
| 1 | 45.0 | .511 | 58.5 | N.N.W. | 126 | 4.0 | 28 | 8 A | | | | |
| 2 | 44.0 | .586 | 49.5 | S. | 43 | 3.0 | 24 | 6 P | | | | |
| 3 | 50.0 | .490 | 75.0 | S. | 127 | 3.5 | 26 | 12 M | 1 P | 12 P | .36 | |
| 4 | 48.5 | .593 | 58.0 | W.N.W. | 165 | 6.5 | 36 | 10 A | | | | |
| 5 | 55.0 | .552 | 79.5 | N.N.E. | 87 | 5.0 | 32 | 12 M | 11 A | 7 P | .60 | |
| 6 | 54.0 | .526 | 80.5 | N.E. | 84 | 2.0 | 20 | 3 P | | | | |
| 7 | 51.5 | .537 | 73.0 | E. | 133 | 3.0 | 24 | 12 M | 8 P | 11 P | .08 | |
| 8 | 53.5 | .455 | 89.5 | E. | 126 | 1.5 | 17 | 12 P | 8 P | 12 P | .07 | |
| 9 | 48.0 | .369 | 91.5 | N.E. | 139 | 1.5 | 17 | 0 A | 0 A | 3 P | .20 | |
| 10 | 47.0 | .376 | 86.5 | N.E. | 142 | 0.5 | 10 | 1 P | | | | |
| 11 | 51.0 | .435 | 86.0 | E.N.E. | 23 | 1.0 | 14 | 11 P | 1 P | 3 P | .40 | |
| 12 | 56.0 | .543 | 84.0 | N.N.E. | 41 | 4.5 | 30 | 7 P | 2 P | 7 P | .50 | |
| 13 | 55.0 | .565 | 77.5 | N.N.E. | 75 | 2.5 | 22 | 4 P | 2 P | 9 P | .50 | |
| 14 | 54.0 | .560 | 75.5 | S.S.E. | 51 | 0.5 | 10 | 6 P | | | | |
| 15 | 51.0 | .485 | 77.5 | E.S.E. | 138 | 1.0 | 14 | 5 P | | | | |
| 16 | 54.0 | .484 | 88.5 | E.S.E. | 92 | 1.5 | 17 | 11 P | 5 A | 12 P | .30 | |
| 17 | 61.5 | .593 | 93.5 | S.S.E. | 201 | 2.0 | 20 | 12 M | 0 A | 8 P | 1.16 | |
| 18 | 53.0 | .602 | 67.5 | S. | 77 | 2.5 | 22 | 2 P | 3 P | | T | |
| 19 | 57.0 | .586 | 80.5 | S. | 29 | 1.0 | 14 | 2 P | 10 A | 10 P | .37 | |
| 20 | 51.0 | .533 | 70.5 | W.N.W. | 150 | 5.0 | 32 | 2 P | | | | |
| 21 | 51.5 | .498 | 78.0 | W.N.W. | 68 | 0.5 | 10 | 1 P | 4 P | 8 P | .15 | |
| 22 | 46.0 | .528 | 60.5 | N.W. | 229 | 7.0 | 37 | 11 A | | | | |
| 23 | 52.5 | .579 | 68.0 | N.N.W. | 137 | 2.5 | 22 | 1 P | | | | |
| 24 | 57.0 | .612 | 77.0 | S.S.W. | 64 | 1.0 | 14 | 7 P | | | | |
| 25 | 60.0 | .597 | 87.0 | S.S.W. | 97 | 0.0 | — | — | 4 A | 9 P | .65 | |
| 26 | 60.5 | .699 | 78.5 | W.S.W. | 63 | 1.0 | 14 | 12 M | | | | |
| 27 | 60.0 | .674 | 78.0 | S. | 167 | 2.0 | 20 | 2 P | | | | |
| 28 | 63.5 | .723 | 82.5 | W. | 105 | 0.5 | 10 | 4 P | | | | |
| 29 | 55.0 | .674 | 63.5 | N.W. | 116 | 1.5 | 17 | 6 P | | | | |
| 30 | 52.0 | .708 | 55.5 | N.N.W. | 131 | 3.5 | 26 | 5 P | | | | |

**Rain or melted snow at base of tower. *Included in following day.

## REMARKS

The weather during June was unusually cold and stormy, especially the first half of the month. The backward condition of vegetation which existed at the beginning of the month was not materially changed during the month owing to the adverse features which existed. On only a few days was really warm weather recorded.

A comparison of the records of the several weather elements with the normals shows the following features of interest: The mean barometer was practically normal while the range of pressure was only about two-thirds of the usual amount. Owing to the small fluctuations of pressure the total wind movement was comparatively small. The prevailing wind direction in the Northeast was a very unusual feature for this locality.

The mean hourly temperature was about five degrees below the normal and the lowest since 1903. The maximum temperature was more than seven degrees lower than usual and the lowest June record for that feature since this station was established. The minimum temperature was practically normal.

The mean dew point was more than three degrees lower than usual and the relative humidity was more than three per cent higher owing to the large amount of wet weather.

The total precipitation was more than two inches above the normal, making it the wettest June since 1904.

Several heavy thunderstorms occurred during the first half of the month. There was about one hundred hours of cloudiness more than usual.

J. E. OSTRANDER, Meteorologist.

J. S. SIMS, Observer.

BULLETIN No. 331. JULY, 1916

# Meteorological Observations

AT THE

# MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.
*Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.*
*Height of Wind Instruments 72 ft.*

## MONTHLY SUMMARY.

### **Pressure.** In inches.

| | |
|---|---|
| Maximum reduced to freezing, | 30.06, 15th, 9 A |
| Minimum reduced to freezing, | 29.22, 3d, 3 P |
| Reduced† maximum reading, | 30.35, 15th, 9 A |
| Reduced† minimum reading, | 29.51, 3d, 3 P |
| Mean semi-daily reduced | 29.984 |
| Monthly range | 0.84 |

### ***Air Temperature.** In Degrees Fahr.

| | |
|---|---|
| Highest | 93.5, 31st, 2 P |
| Lowest | 46.5, 1st, 4:30 A |
| Mean hourly | 71.6 |
| Mean of means of max. and min. | 72.5 |
| Mean sensible (wet bulb) | 67.6 |
| Monthly range | 47.0 |
| Highest mean daily | 78.8, 12th |
| Lowest mean daily | 61.4 4th |
| Mean maximum | 82.9 |
| Mean minimum | 62.4 |
| Mean daily range | 20.5 |
| Greatest daily range | 39.5, 1st |
| Least daily range | 7.5, 26th |

### **Humidity.**

| | |
|---|---|
| Mean dew point | 61.9 |
| Mean force of vapor | 0.780 |
| Mean relative humidity | 81.8 |

### **Precipitation.** In inches.

| | |
|---|---|
| Total precipitation | 6.85 |
| Number of days on which .01 inch or more rain fell | 16 |

### **Wind.**

| | |
|---|---|
| Total movement | 3126 m |
| Greatest daily movement | 185m, 16th, 21st |
| Least daily movement | 38m, 24th |
| Mean daily movement | 101 m |
| Mean hourly velocity | 4.2 m |

Maximum pressure per square foot, 9.0 lbs = 42m per hour, 8th, 3 P, N.N.W.

Maximum velocity for 5 minutes, 20m per hour, 31st, 8 P, N.

Prevailing direction, South Southwest.

Summary.

| | |
|---|---|
| South Southwest | 16 per cent |
| South | 39 " " |
| Other directions | 45 " " |

### **Weather.**

| | |
|---|---|
| Mean cloudiness observed | 57 per cent |
| Total cloudiness recorded by the Sun Thermometer | 278 hours = 60 per cent |
| Number of clear days | 1 |
| Number of fair days | 18 |
| Number of cloudy days | 12 |

### **Bright Sunshine.**

Number hours recorded, 184 hrs, = 40 per cent

**Rain,** 2d, 3d, 4th, 8th, 9th, 10th, 13th, 17th, 20th, 21st, 22d, 23d, 25th, 26th, 27th, 28th, 31st.

**Thunder and Lightning,** 2d, 9th, 17th, 21st, 22d, 31st.

**Gales,** 35 or more miles per hour. 42m, 8th, N.N.W.; 36m, 27th, N.N.E.

---

* Temperature in ground shelter.

† Reduced to freezing and sea-level.

# DAILY SUMMARY.

| Day. | Barometer Reduced to Sea Level. | | | Temperature. Ground Shelter. | | | | | | | No. Hours of Bright Sunshine |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Maximum | Minimum. | Mean. Semi-daily. | Maximum | Time. | Minimum. | Time. | Mean of Max. and Min. | Mean Hourly Draper. | Mean Sensible Wet Bulb. | |
| 1 | 29.99 | 29.83 | 29 889 | 86.0 | 3:30 P | 46.5 | 4:30 A | 66.3 | 67.5 | 65 0 | 11.0 |
| 2 | 29.87 | 29.61 | 29.778 | 85.0 | 3:30 P | 56.5 | 4 A | 70.7 | 69 9 | 65.5 | 5.5 |
| 3 | 29.66 | 29.51 | 29.557 | 79.0 | 4 P | 61.5 | 4:30 A | 70.3 | 68 6 | 61.7 | 3.5 |
| 4 | 29.83 | 29 57 | 29.713 | 66.5 | 1:30 P | 57.5 | 12 P | 62.0 | 61.4 | 57.3 | 0.0 |
| 5 | 30.09 | 29.86 | 30.007 | 74 0 | 3:30 P | 57.0 | 3 A | 65.5 | 62.7 | 60.3 | 0.5 |
| 6 | 30.12 | 29 98 | 30.052 | 86 5 | 3:30 P | 52.0 | 2 A | 69.3 | 69.0 | 63.7 | 11.0 |
| 7 | 30.02 | 29 88 | 29.935 | 88.5 | 2:30 P | 57.0 | 5 A | 72.7 | 75.0 | 68.0 | 10.5 |
| 8 | 29.94 | 29.82 | 29.865 | 88.5 | 3 P | 65.5 | 4:30 A | 77.0 | 74.6 | 70.0 | 7.0 |
| 9 | 30.08 | 29.94 | 30.057 | 74.0 | 4 P | 61.0 | 7 A | 67.5 | 67 2 | 64.0 | 0.5 |
| 10 | 30.10 | 30 03 | 30.067 | 79 0 | 2 P | 62.0 | 4 A | 70.5 | 67.7 | 65 7 | 1.8 |
| 11 | 30.06 | 29.93 | 29 984 | 84 5 | 3:30 P | 68.0 | 2 A | 76.3 | 74.0 | 72.0 | 0.3 |
| 12 | 29.98 | 29.84 | 29.895 | 92.0 | 2 P | 67.5 | 4:30 A | 79.7 | 78.8 | 74.0 | 8.5 |
| 13 | 29.96 | 29 81 | 29.891 | 83.5 | 12 M | 68.0 | 12 P | 75.7 | 75.0 | 76.0 | 0 0 |
| 14 | 30.32 | 29.96 | 30.185 | 81 0 | 3:30 P | 59.0 | 12 P | 70.0 | 70.3 | 62.5 | 7.6 |
| 15 | 30 35 | 30.22 | 30.290 | 80.0 | 4 P | 53 0 | 4:30 A | 66.5 | 66.1 | 60.5 | 10.5 |
| 16 | 30.25 | 29.93 | 30.047 | 84.0 | 3 P | 55.5 | 5 A | 69.7 | 69.5 | 64.5 | 7.8 |
| 17 | 30.09 | 29 96 | 30.017 | 78.5 | 3 P | 66.0 | 3 A | 72.3 | 71.3 | 68.3 | 0.3 |
| 18 | 30.15 | 30.09 | 30.131 | 88 5 | 2 P | 69.5 | 3:30 A | 79.0 | 77.0 | 71.0 | 6.6 |
| 19 | 30.13 | 29 99 | 30.070 | 89 0 | 5 P | 66.0 | 5 A | 77.5 | 76.6 | 70.3 | 9.5 |
| 20 | 30.06 | 29.78 | 29.963 | 90 0 | 2 P | 63.0 | 4:30 A | 76.5 | 76.4 | 70.5 | 9.2 |
| 21 | 29.78 | 29.57 | 29.641 | 83.5 | 5 P | 71.0 | 2 A | 77.3 | 74.4 | 71.0 | 0.8 |
| 22 | 29 86 | 29.76 | 29.848 | 83.0 | 3 P | 69.0 | 11 P | 76.0 | 72.8 | 71.3 | 6.5 |
| 23 | 29.91 | 29.87 | 29.902 | 82.0 | 5:30 P | 69 5 | 0 A | 75.7 | 74.3 | 71.7 | 9 3 |
| 24 | 30.10 | 29.99 | 30 070 | 86.0 | 2:30 P | 70 0 | 4 A | 78 0 | 75.9 | 71.0 | 10.7 |
| 25 | 30.13 | 30.10 | 30.129 | 83.0 | 1 P | 69.0 | 12 P | 76.0 | 73.7 | 69.5 | 6.2 |
| 26 | 30.15 | 30.05 | 30 093 | 77.0 | 5 P | 69.5 | 1 A | 73.3 | 72.5 | 71.7 | 0.4 |
| 27 | 30.17 | 30.01 | 30.076 | 89 0 | 2 P | 70.0 | 12 P | 79.5 | 76.0 | 72.7 | 7.6 |
| 28 | 80.27 | 30.17 | 30.256 | 78.5 | 2:30 P | 57.5 | 12 P | 68.0 | 70.5 | 64.5 | 11.7 |
| 29 | 30.33 | 30.20 | 30.259 | 77.5 | 3 P | 50.5 | 5:30 A | 64.0 | 64.3 | 61.5 | 11.2 |
| 30 | 30.21 | 29 91 | 30.010 | 79.0 | 3 P | 59.0 | 3 A | 69.0 | 70.2 | 68.5 | 0.0 |
| 31 | 29.91 | 29.70 | 29.842 | 93.5 | 2 P | 67.0 | 5:30 A | 80.3 | 77.8 | 72.3 | 7.9 |

# DAILY SUMMARY.

| Day. | Humidity. | | | Wind. | | | | | Precipitation. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Total in Inches. | |
| | Mean Dew Point. | Mean Force vapor. | Mean Relative Humidity. | Prevailing Direction. | Total Movement in Miles. | Maximum Pressure Per Square Ft | Miles per Hour. | Time. | Beginning. | Ending. | Rain.** | Snow. |
| 1 | 59.5 | .829 | 62.5 | N.W. | 123 | 5.0 | 32 | 12 M | | | | |
| 2 | 61.5 | .783 | 71.5 | S.S.W. | 139 | 3.5 | 26 | 7 P | 9 P | 12 P | .46 | |
| 3 | 58.5 | .655 | 75.5 | W.N.W. | 118 | 0.5 | 10 | 4 P | 0 A | 4 A | .38 | |
| 4 | 53.5 | .562 | 74.0 | N.N.W. | 153 | 1.5 | 17 | 1 P | 7 P | 12 P | .04 | |
| 5 | 57.5 | .592 | 80.5 | N. | 124 | 1.0 | 14 | 12 M | | | | |
| 6 | 61.5 | .707 | 78.5 | N. | 68 | 1.0 | 14 | 1 P | | | | |
| 7 | 64.5 | .865 | 72.5 | W. | 98 | 0.5 | 10 | 2 P | | | | |
| 8 | 67.0 | .865 | 79.0 | W.N.W. | 122 | 9.0 | 42 | 3 P | 4 P | 8 P | .34 | |
| 9 | 63.0 | .636 | 91.0 | E.N.E. | 78 | 0.5 | 10 | 3 P | 3 A | 12 P | 1.29 | |
| 10 | 65.0 | .687 | 89.0 | S. | 60 | 1.0 | 14 | 4 P | 0 A | 6 A | .06 | |
| 11 | 71.0 | .836 | 92.0 | S.S.W. | 140 | 1.0 | 14 | 2 P | | | | |
| 12 | 71.5 | .986 | 80.0 | S.W. | 162 | 3.0 | 24 | 4 P | | | | |
| 13 | 69.5 | .853 | 86.0 | S. | 97 | 0.5 | 10 | 10 A | 1 P | 7 P | .26 | |
| 14 | 59.5 | .665 | 78.0 | E.N.E. | 77 | 0.0 | — | — | | | | |
| 15 | 56.0 | .675 | 75.0 | S.S.W. | 102 | 1.5 | 17 | 6 P | | | | |
| 16 | 61.5 | .727 | 77.0 | S. | 185 | 2.0 | 20 | 1 P | | | | |
| 17 | 66.0 | .770 | 84.5 | S. | 88 | 0.5 | 10 | 5 P | 7 A | 2 P | .45 | |
| 18 | 68.0 | .893 | 78.0 | S. | 74 | 0.5 | 10 | 2 P | | | | |
| 19 | 67.5 | .874 | 79.0 | S. | 94 | 1.0 | 14 | 4 P | | | | |
| 20 | 68.0 | .865 | 81.5 | S. | 74 | 0.5 | 10 | 1 P | 11 P | 12 P | .06 | |
| 21 | 69.0 | .861 | 83.0 | N.N.E. | 185 | 1.5 | 17 | 1 P | 0 A | 10 P | .81 | |
| 22 | 70.5 | .794 | 94.0 | S. | 47 | 1.0 | 14 | 3 P | 7 A | 11 P | 1.32 | |
| 23 | 70.0 | .870 | 87.5 | S.S.W. | 63 | 1.0 | 14 | 1 P | 7 P | | T | |
| 24 | 69.0 | .857 | 83.0 | S. | 38 | 0.0 | — | — | | | | |
| 25 | 68.5 | .802 | 86.0 | S. | 57 | 1.0 | 14 | 6 P | 5 P | 12 P | .61 | |
| 26 | 71.5 | .804 | 95.0 | S. | 123 | 1.5 | 17 | 2 P | 8 A | 12 P | .56 | |
| 27 | 72.0 | .857 | 92.0 | N N.W. | 78 | 6.5 | 36 | 3 P | 0 A | 12 P | .16 | |
| 28 | 61.5 | .746 | 72.5 | N.N.E. | 77 | 0.0 | — | — | 0 A | 2 A | .03 | |
| 29 | 60.0 | .597 | 87.0 | S.S.W. | 86 | 1.5 | 17 | 12 M | | | | |
| 30 | 67.5 | .770 | 88.0 | S. | 112 | 0.0 | — | — | | | | |
| 31 | 70.5 | .909 | 82.0 | W. | 84 | 3.0 | 24 | 8 P | 4 P | 5 P | .02 | |

**Rain or melted snow at base of tower.   *Included in following day.

## REMARKS

The weather during July was marked by an unusually high humidity and large rainfall. The unusually large percentage of wind from the South caused many oppressive, sultry days and frequent rains, some with unusually large precipitation. The total rainfall was more than fifty per cent above the normal. The disagreeable character of the weather was prevalent during the whole month.

The records of the several weather elements show the following features of interest. The mean barometer was practically normal and the range of pressure slightly larger than usual. The total wind movement was considerably less than the normal, and there were no daily records of any considerable size. Only two gales were noted, and both were of moderate intensity and short duration. South or South Southwest wind was recorded more than one-half the days of the month, the remaining days being divided among most of the other directions.

The mean temperature was about one degree above the normal, while the maximum and minimum were near the usual values. The large amount of cloudiness should be considered with the temperature record in judging the general oppressiveness.

The mean dew point was practically normal, while the relative humidity was more than eight points above the normal, showing the highest humidity for July in ten years.

The total precipitation was two and one-half inches more than the normal, and was well distributed throughout the month.

Only one clear day was noted.

J. E. OSTRANDER, Meteorologist.

J. S. SIMS, Observer.

**BULLETIN No. 332. AUGUST, 1916**

# Meteorological Observations
AT THE
# MASSACHUSETTS
# AGRICULTURAL EXPERIMENT
# STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.
*Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.*
*Height of Wind Instruments 72 ft.*

## MONTHLY SUMMARY.

### Pressure. In inches.

| | |
|---|---|
| Maximum reduced to freezing | 29.97, 29th, 9 A |
| Minimum reduced to freezing | 29.23, 8th, 1 P |
| Reduced† maximum reading | 30.27, 29th, 9 A |
| Reduced† minimum reading | 29.51, 8th, 1 P |
| Mean semi-daily reduced | 29.977 |
| Monthly range | 0.76 |

### *Air Temperature. In Degrees Fahr.

| | |
|---|---|
| Highest | 95.5, 22d, 3:30 P |
| Lowest | 45.0, 29th, 2 A |
| Mean hourly | 69.5 |
| Mean of means of max. and min. | 70.5 |
| Mean sensible (wet bulb) | 64.0 |
| Monthly range | 50.5 |
| Highest mean daily | 79.3, 22d |
| Lowest mean daily | 57.7 28th |
| Mean maximum | 82.6 |
| Mean minimum | 58.3 |
| Mean daily range | 24.3 |
| Greatest daily range | 35.0, 21st |
| Least daily range | 9.5, 10th |

### Humidity.

| | |
|---|---|
| Mean dew point | 61.3 |
| Mean force of vapor | .698 |
| Mean relative humidity | 80.7 |

### Precipitation. In inches.

| | |
|---|---|
| Total precipitation | 2.49 |
| Number of days on which .01 inch or more rain fell | 8 |

### Wind.

| | |
|---|---|
| Total movement | 3120 m |
| Greatest daily movement | 242m, 3d |
| Least daily movement | 41m, 21st |
| Mean daily movement | 101 m |
| Mean hourly velocity | 4.2 m |

Maximum pressure per square foot, 20.5 lbs = 64m per hour, 23d, 5 P, S.S.W.

Maximum velocity for 5 minutes, 18m per hour, 14th, 3 P, W.

Prevailing direction, South Southwest.

### Summary.

| | |
|---|---|
| North | 10 per cent |
| South Southwest | 39 " " |
| East Southeast | 13 " " |
| South | 10 " " |
| Other directions | 28 " " |

### Weather.

| | |
|---|---|
| Mean cloudiness observed | 54 per cent |
| Total cloudiness recorded by the Sun Thermometer | 170 hours = 40 per cent |
| Number of clear days | 10 |
| Number of fair days | 14 |
| Number of cloudy days | 7 |

### Bright Sunshine.

Number hours recorded, 259 hrs, = 60 per cent

**Rain.** 8th, 9th, 11th, 12th, 13th, 23d, 26th, 27th, 28th.

**Thunder and Lightning.** 8th, 23d, 26th, 27th.

**Gales,** 35 or more miles per hour. 64m, 23d, S.S.W.; 40m, 27th, S.S.W.

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* Temperature in ground shelter.

† Reduced to freezing and sea-level.

# DAILY SUMMARY.

| Day. | Barometer Reduced to Sea Level. | | | Temperature. Ground Shelter. | | | | | | | No. Hours of Bright Sunshine. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Maximum | Minimum. | Mean. Semi-daily. | Maximum | Time. | Minimum. | Time. | Mean of Max. and Min. | Mean Hourly Draper. | Mean Sensible Wet Bulb. | |
| 1 | 30.19 | 29.88 | 30.067 | 82.0 | 4 P | 58.0 | 12 P | 70.0 | 69.7 | 61.7 | 12.8 |
| 2 | 30.22 | 30.08 | 30.161 | 83.0 | 3:30 P | 51.0 | 5:30 A | 67.0 | 66.6 | 60.0 | 12.7 |
| 3 | 30.12 | 29.95 | 30.015 | 80.0 | 1:30 P | 58.5 | 5 A | 69.3 | 69.3 | 64.3 | 8.3 |
| 4 | 30.11 | 30.01 | 30.047 | 86.5 | 4:30 P | 64.0 | 4 A | 75.3 | 74.1 | 69.5 | 8.3 |
| 5 | 30.13 | 30.00 | 30.065 | 83.5 | 3 P | 70.0 | 6 A | 76.7 | 74.0 | 70.7 | 3.5 |
| 6 | 30.13 | 30.00 | 30.082 | 90.0 | 3 P | 71.0 | 3 A | 80.5 | 77.2 | 69.5 | 8.7 |
| 7 | 30.12 | 29.75 | 29.923 | 91.0 | 3:30 P | 68.0 | 7 A | 79.5 | 77.2 | 70.7 | 6.8 |
| 8 | 29.75 | 29.51 | 29.685 | 93.0 | 0:30 P | 71.5 | 12 P | 82.3 | 77.2 | 74.3 | 4.7 |
| 9 | 30.02 | 29.62 | 29.825 | 78.0 | 10:30 A | 59.5 | 12 P | 68.7 | 68.8 | 65.0 | 1.9 |
| 10 | 30.19 | 30.02 | 30.131 | 68.0 | 2 P | 58.5 | 5 A | 63.3 | 63.5 | 59.0 | 0.0 |
| 11 | 30.21 | 29.95 | 30.112 | 77.0 | 4 P | 59.5 | 3 A | 68.3 | 66.7 | 61.5 | 7.5 |
| 12 | 29.95 | 29.78 | 29.840 | 85.5 | 2 P | 64.0 | 3 A | 74.7 | 72.6 | 68.5 | 8.7 |
| 13 | 29.83 | 29.70 | 29.801 | 70.5 | 4 P | 52.0 | 12 P | 61.3 | 61.5 | 54.3 | 2.8 |
| 14 | 29.87 | 29.73 | 29.819 | 76.0 | 3 P | 47.0 | 5 A | 61.5 | 62.3 | 57.7 | 13.9 |
| 15 | 29.94 | 29.86 | 29.918 | 81.0 | 4:30 P | 49.0 | 5:30 A | 65.0 | 66.3 | 61.7 | 12.5 |
| 16 | 30.04 | 29.93 | 29.983 | 83.5 | 2:30 P | 54.0 | 6 A | 68.7 | 68.4 | 64.7 | 9.3 |
| 17 | 30.17 | 30.04 | 30.098 | 88.0 | 3:30 P | 62.5 | 6 A | 75.3 | 74.2 | 65.0 | 11.4 |
| 18 | 30.20 | 30.08 | 30.147 | 87.0 | 4:30 P | 57.5 | 5 A | 72.3 | 72.4 | 67.5 | 11.3 |
| 19 | 30.17 | 30.07 | 30.125 | 90.0 | 5 P | 60.0 | 5:30 A | 75.0 | 73.2 | 67.5 | 10.4 |
| 20 | 30.10 | 29.99 | 30.065 | 90.5 | 3:30 P | 59.5 | 6 A | 75.0 | 73.5 | 66.5 | 11.5 |
| 21 | 29.99 | 29.75 | 29.847 | 94.0 | 4:30 P | 59.0 | 5:30 A | 76.5 | 76.0 | 69.0 | 11.4 |
| 22 | 29.77 | 29.78 | 29.910 | 95.5 | 3:30 P | 66.5 | 5:30 A | 81.0 | 79.3 | 71.0 | 10.3 |
| 23 | 29.78 | 29.57 | 29.756 | 92.0 | 2:30 P | 67.5 | 3:30 A | 79.7 | 75.0 | 69.7 | 10.2 |
| 24 | 29.79 | 29.67 | 29.750 | 71.5 | 3 P | 57.0 | 12 P | 64.3 | 66.3 | 62.5 | 4.2 |
| 25 | 29.94 | 29.79 | 29.837 | 82.5 | 3 P | 50.0 | 4 A | 66.3 | 65.2 | 59.0 | 11.0 |
| 26 | 29.94 | 29.87 | 29.921 | 83.5 | 3 P | 56.5 | 4:30 A | 70.0 | 68.5 | 60.7 | 6.7 |
| 27 | 30.00 | 29.86 | 29.921 | 82.5 | 4 P | 61.0 | 6 A | 71.7 | 69.7 | 63.5 | 7.0 |
| 28 | 30.17 | 30.00 | 30.090 | 62.5 | 9 A | 48.0 | 12 P | 55.3 | 57.7 | 55.0 | 0.3 |
| 29 | 30.27 | 30.13 | 30.204 | 75.0 | 2:30 P | 45.0 | 2 A | 60.0 | 58.1 | 52.3 | 10.1 |
| 30 | 30.15 | 29.98 | 30.076 | 80.0 | 3 P | 49.0 | 6:30 A | 64.5 | 64.3 | 58.7 | 11.3 |
| 31 | 30.12 | 30.05 | 30.097 | 79.5 | 1:30 P | 54.0 | 12 P | 66.7 | 65.9 | 59.3 | 9.8 |

# DAILY SUMMARY.

| Day. | Humidity. | | | Wind. | | | | | Precipitation. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Mean Dew Point. | Mean Force vapor. | Mean Relative Humidity. | Prevailing Direction. | Total Movement in Miles. | Maximum Pressure Per Square Ft | Miles per Hour. | Time. | Beginning. | Ending. | Total in Inches. Rain.** | Total in Inches. Snow. |
| 1 | 57.5 | .690 | 69.5 | N. | 193 | 3.0 | 24 | 7 P | | | | |
| 2 | 56.0 | .638 | 70.5 | S.S.W. | 117 | 2.0 | 20 | 6 P | | | | |
| 3 | 60.0 | .734 | 73.0 | S.S.W. | 242 | 2.5 | 22 | 10 A | | | | |
| 4 | 68.0 | .800 | 87.5 | S.S.W. | 118 | 0.0 | — | — | | | | |
| 5 | 69.5 | .816 | 89.5 | S.S.W. | 122 | 1.0 | 14 | 12 M | | | | |
| 6 | 68.0 | .832 | 82.0 | E.S.E. | 108 | 0.0 | — | — | | | | |
| 7 | 70.0 | .819 | 90.5 | S. | 91 | 1.5 | 17 | 6 P | | | | |
| 8 | 72.5 | .963 | 84.0 | S.S.W. | 125 | 2.5 | 22 | 12 M | 3 P | 12 P | .10 | |
| 9 | 62.5 | .711 | 82.0 | E.S.E. | 92 | 1.0 | 14 | 12 M | 0 A | 4 A | .04 | |
| 10 | 56.0 | .580 | 78.5 | N.N.E. | 151 | 0.5 | 10 | 8 P | | | | |
| 11 | 58.5 | .638 | 78.5 | E.S.E. | 113 | 0.0 | — | — | 9 P | 12 P | .14 | |
| 12 | 65.0 | .797 | 88.0 | W. | 116 | 2.0 | 20 | 4 P | 0 A | 2 A | .06 | |
| 13 | 50.0 | .504 | 73.5 | N.W. | 138 | 1.5 | 17 | 12 M | 5 A | 9 A | .08 | |
| 14 | 54.0 | .578 | 74.0 | W.N.W. | 182 | 4.0 | 28 | 2 P | | | | |
| 15 | 58.0 | .670 | 73.5 | S.S.W. | 83 | 1.0 | 14 | 2 P | | | | |
| 16 | 63.0 | .687 | 85.0 | S.W. | 73 | 0.5 | 10 | 1 P | | | | |
| 17 | 61.0 | .780 | 70.0 | N.E. | 68 | 0.0 | — | — | | | | |
| 18 | 65.0 | .763 | 81.5 | S S.W. | 42 | 0.0 | — | — | | | | |
| 19 | 66.5 | .744 | 88.5 | S.S.W. | 47 | 0.0 | — | — | | | | |
| 20 | 64.0 | .786 | 79.5 | S.S.W. | 44 | 0.0 | — | — | | | | |
| 21 | 67.0 | .863 | 78.0 | S.S.W. | 41 | 0.0 | — | — | | | | |
| 22 | 68.0 | .960 | 71.0 | N.N.E. | 57 | 0.0 | — | — | | | | |
| 23 | 69.0 | .780 | 91.0 | S. | 137 | 20.5 | 64 | 5 P | 5 P | 9 P | 1.44 | |
| 24 | 60.5 | .630 | 85.0 | N. | 68 | 0.0 | — | — | | | | |
| 25 | 58.0 | .537 | 90.5 | W. | 49 | 0.5 | 10 | 2 P | | | | |
| 26 | 56.5 | .674 | 70.5 | E.S.E. | 73 | 2.0 | 20 | 4 P | 8 A | | T | |
| 27 | 61.5 | .656 | 84.0 | S. | 150 | 8.0 | 40 | 8 P | 6 P | 7 P | .21 | |
| 28 | 52.5 | .489 | 81.0 | N. | 76 | 0.5 | 10 | 5 P | 9 A | 2 P | .42 | |
| 29 | 50.0 | .436 | 86.0 | S S.W. | 50 | 0.0 | — | — | | | | |
| 30 | 57.0 | .545 | 86.5 | S S.W. | 86 | 0.0 | — | — | | | | |
| 31 | 56.0 | .565 | 79.5 | S.W. | 68 | 0.5 | 10 | 3 P | | | | |

**Rain or melted snow at base of tower.

*Included in following day.

## REMARKS

The weather during August, while generally seasonable, was more variable than usual. The first fourth of the month was a period of high temperature and high humidity. The second fourth was considerably cooler and pleasanter. The third quarter was the warmest period, although the relative humidity was less than during the first part of the month. The last quarter of the month was the nearest to normal conditions.

The total precipitation was much below the normal, in marked contrast with these records for the preceding two months. The thunder storm on the 23d was unusually severe in this locality, and considerable damage was done.

The following features of the several weather elements are shown on comparing with the normals for this station. The mean barometer was slightly below the normal and the range a little larger than usual. On more than one-half the days the maximum wind pressure was less than one pound and the daily wind movement small. Wind from the south points of the compass was much more frequent than usual.

The maximum temperature was nearly four degrees above the normal, and the highest record so far this year. The mean hourly temperature was nearly two degrees higher than usual. The minimum record was also rather high.

The mean dew point and relative humidity were both higher than the normals for these elements.

The total precipitation was about 60 per cent of the normal, and more than one-half of it occurred during the severe thunder storm mentioned above.

The total wind movement was practically normal and the amount of bright sunshine considerably more than the average value.

J. E. OSTRANDER, Meteorologist.

J. S. SIMS, Observer.

BULLETIN No. 333. SEPTEMBER, 1916

# Meteorological Observations
AT THE
# MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.
*Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.*
*Height of Wind Instruments 72 ft.*

## MONTHLY SUMMARY.

### **Pressure.** In inches.

| | |
|---|---|
| Maximum reduced to freezing, | 30.24, 11th, 10 A |
| Minimum reduced to freezing, | 29.38, 8th, 2 P |
| Reduced† maximum reading, | 30.53, 11th, 10 A |
| Reduced† minimum reading, | 29.66, 8th, 2 P |
| Mean semi-daily reduced | 30.036 |
| Monthly range | 0.87 |

### ***Air Temperature.** In Degrees Fahr.

| | |
|---|---|
| Highest | 89.5, 14th, 3 P |
| Lowest | 36.5, 20th, 6 A |
| Mean hourly | 60.8 |
| Mean of means of max. and min. | 61.3 |
| Mean sensible (wet bulb) | 55.5 |
| Monthly range | 53.0 |
| Highest mean daily | 74.9, 8th |
| Lowest mean daily | 50.0, 30th |
| Mean maximum | 73.9 |
| Mean minimum | 48.6 |
| Mean daily range | 25.3 |
| Greatest daily range | 41.5, 14th |
| Least daily range | 6.0, 6th |

### **Humidity.**

| | |
|---|---|
| Mean dew point | 52.6 |
| Mean force of vapor | .510 |
| Mean relative humidity | 81.3 |

### **Precipitation.** In inches.

| | |
|---|---|
| Total precipitation, in inches | 5.08 |
| Number of days on which .01 inch or more rain fell | 8 |

### **Wind.**

| | |
|---|---|
| Total movement | 3717 m |
| Greatest daily movement | 320m, 29th |
| Least daily movement | 35m, 14th |
| Mean daily movement | 124 m |
| Mean hourly velocity | 5.2 m |

Maximum pressure per square foot, 9.5 lbs = 44m per hour, 29th, 2 P, S.

Maximum velocity for 5 minutes, 24m per hour, 29th, 2P, S.

Prevailing direction, West Southwest.

Summary.

| | |
|---|---|
| North Northwest | 10 per cent |
| South Southwest | 30 " " |
| West Southwest | 10 " " |
| South | 13 " " |
| Other directions | 37 " " |

### **Weather.**

| | |
|---|---|
| Mean cloudiness observed | 45 per cent |
| Total cloudiness recorded by the Sun Thermometer | 118 hours = 32 per cent |
| Number of clear days | 16 |
| Number of fair days | 10 |
| Number of cloudy days | 4 |

### **Bright Sunshine.**

Number hours recorded, 255 hrs, = 68 per cent

**Rain,** 5th, 6th, 7th, 8th, 15th, 18th, 19th, 23d, 28th, 29th.

**Thunder and Lightning,** 15th, 18th, 29th.

**Frosts,** 17th, 20th, 26th.

**Gales,** 35 or more miles per hour. 44m, 29th, S.

---

* Temperature in ground shelter.

† Reduced to freezing and sea-level.

# DAILY SUMMARY.

| Day. | Barometer Reduced to Sea Level. | | | Temperature. Ground Shelter. | | | | | | | No. Hours of Bright Sunshine. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Maximum | Minimum. | Mean. Semi-daily. | Maximum | Time. | Minimum. | Time. | Mean of Max. and Min. | Mean Hourly Draper. | Mean Sensible Wet Bulb. | |
| 1 | 30.12 | 29.86 | 30.007 | 86.0 | 3 P | 47.5 | 6 A | 66.7 | 67.7 | 64.7 | 8.4 |
| 2 | 30.13 | 29.81 | 29.934 | 75.0 | 1 P | 47.0 | 12 P | 61.0 | 66.3 | 65.0 | 8.5 |
| 3 | 30.30 | 30.13 | 30.280 | 68.5 | 5:30 P | 37.5 | 5:30 A | 53.0 | 53.5 | 46.5 | 12.0 |
| 4 | 30.30 | 30.03 | 30.158 | 76.0 | 3 P | 47.0 | 5 A | 61.5 | 61.6 | 54.5 | 10.8 |
| 5 | 30.16 | 30.01 | 30.096 | 67.0 | 3 P | 57.5 | 5 A | 62.3 | 60.6 | 55.7 | 0.2 |
| 6 | 30.16 | 30.04 | 30.106 | 59.0 | 12 P | 53.0 | 6 A | 56.0 | 56.0 | 55.0 | 0.0 |
| 7 | 30.04 | 29.81 | 29.936 | 83.5 | 4 P | 58.0 | 5 A | 70.7 | 69.7 | 66.7 | 7.1 |
| 8 | 29.81 | 29.66 | 29.743 | 86.5 | 2:30 P | 70.5 | 6 A | 78.5 | 74.9 | 70.7 | 7.2 |
| 9 | 30.15 | 29.74 | 29.985 | 74.5 | 3 P | 60.0 | 5 A | 67.3 | 64.3 | 53.3 | 11.5 |
| 10 | 30.38 | 30.15 | 30.329 | 76.5 | 2:30 P | 44.5 | 6 A | 60.5 | 59.7 | 50.5 | 12.0 |
| 11 | 30.53 | 30.38 | 30.459 | 75.0 | 3:30 P | 42.0 | 6:30 A | 58.5 | 57.5 | 51.3 | 11.5 |
| 12 | 30.42 | 30.16 | 30.302 | 77.5 | 4 P | 41.0 | 5:30 A | 59.3 | 58.5 | 51.5 | 11.0 |
| 13 | 30.16 | 29.96 | 30.078 | 84.0 | 3 P | 55.0 | 6 A | 69.5 | 64.7 | 57.3 | 11.5 |
| 14 | 30.04 | 29.90 | 29.977 | 89.5 | 3 P | 48.0 | 5 A | 68.7 | 68.2 | 63.5 | 10.3 |
| 15 | 29.91 | 29.77 | 29.816 | 74.0 | 9 A | 62.5 | 12 P | 68.3 | 68.2 | 67.7 | 0.4 |
| 16 | 30.14 | 29.80 | 30.036 | 68.5 | 2 P | 44.0 | 12 P | 56.3 | 58.8 | 52.3 | 10.3 |
| 17 | 30.26 | 30.10 | 30.184 | 67.0 | 3 P | 37.0 | 7 A | 52.0 | 52.7 | 47.3 | 11.5 |
| 18 | 30.10 | 29.95 | 30.066 | 73.0 | 3 P | 41.5 | 5:30 A | 57.3 | 56.0 | 50.5 | 7.8 |
| 19 | 30.12 | 29.99 | 30.094 | 63.0 | 3 P | 41.0 | 12 P | 52.0 | 52.6 | 45.3 | 11.0 |
| 20 | 30.15 | 30.01 | 30.116 | 73.0 | 3 P | 36.5 | 6 A | 54.7 | 55.2 | 49.7 | 10.5 |
| 21 | 30.06 | 29.95 | 29.981 | 74.5 | 3 P | 43.0 | 6 A | 58.7 | 59.2 | 52.0 | 10.5 |
| 22 | 29.97 | 29.92 | 29.957 | 75.0 | 2 P | 56.0 | 0 A | 65.5 | 63.5 | 59.7 | 7.0 |
| 23 | 29.94 | 29.73 | 29.850 | 71.0 | 4 P | 54.0 | 12 P | 62.5 | 62.5 | 60.5 | 0.6 |
| 24 | 29.86 | 29.79 | 29.841 | 65.0 | 3 P | 47.0 | 5 A | 56.0 | 56.0 | 55.5 | 9.3 |
| 25 | 29.88 | 29.76 | 29.847 | 64.0 | 4:30 P | 45.0 | 12 P | 54.5 | 52.6 | 46.0 | 8.6 |
| 26 | 29.99 | 29.88 | 29.963 | 71.0 | 4 P | 37.5 | 5:30 A | 54.3 | 54.0 | 47.3 | 12.1 |
| 27 | 30.04 | 29.93 | 30.015 | 83.5 | 3 P | 55.5 | 0 A | 69.5 | 67.0 | 59.3 | 8.3 |
| 28 | 30.05 | 29.94 | 29.999 | 79.0 | 2:30 P | 59.0 | 6 A | 69.0 | 68.4 | 63.3 | 10.0 |
| 29 | 29.95 | 29.68 | 29.830 | 77.0 | 12 M | 52.0 | 12 P | 64.5 | 65.5 | 60.3 | 5.0 |
| 30 | 30.25 | 29.79 | 30.085 | 59.0 | 2:30 P | 39.0 | 12 P | 49.0 | 50.0 | 42.7 | 10.1 |

# DAILY SUMMARY.

| Day. | Humidity. | | | Wind. | | | | | Precipitation. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Mean Dew Point. | Mean Force vapor. | Mean Relative Humidity. | Prevailing Direction. | Total Movement in Miles. | Maximum Pressure Per Square Ft | Miles per Hour. | Time. | Beginning. | Ending. | Total in Inches. Rain.** | Total in Inches. Snow. |
| 1 | 63.0 | .710 | 84.0 | S.S.W. | 87 | 1.5 | 17 | 8 P | | | | |
| 2 | 56.0 | .601 | 78.0 | W.N.W. | 254 | 5.0 | 32 | 11 A | | | | |
| 3 | 41.0 | .383 | 68.5 | N.W. | 74 | 2.0 | 20 | 9 A | | | | |
| 4 | 50.5 | .509 | 74.5 | S.S.W. | 160 | 3.5 | 26 | 4 P | | | | |
| 5 | 53.5 | .496 | 83.0 | E.N.E. | 107 | 0.0 | — | — | 1 P | | T | |
| 6 | 54.0 | .456 | 91.5 | N.N.W. | 38 | 0.0 | — | — | 0 A | 9 A | .24 | |
| 7 | 65.5 | .715 | 90.5 | S.S.W. | 65 | 1.0 | 14 | 3 P | 4 A | 5 A | .01 | |
| 8 | 69.5 | .780 | 92.0 | W. | 120 | 0.5 | 10 | 11 A | 4 P | 12 P | .04 | |
| 9 | 45.5 | .545 | 56.0 | N.N.E. | 222 | 3.0 | 24 | 9 A | | | | |
| 10 | 44.5 | .485 | 65.5 | N.N.E. | 108 | 1.0 | 14 | 12 M | | | | |
| 11 | 47.0 | .427 | 78.5 | S.S.E. | 52 | 0.0 | — | — | | | | |
| 12 | 49.5 | .440 | 83.5 | S.S.W. | 100 | 1.0 | 14 | 3 P | | | | |
| 13 | 54.5 | .531 | 81.0 | S.S.W. | 80 | 1.0 | 14 | 2 P | | | | |
| 14 | 63.0 | .636 | 95.0 | W.S.W. | 35 | 0.0 | — | — | | | | |
| 15 | 67.0 | .704 | 95.0 | S. | 104 | 2.5 | 22 | 9 A | 5 A | 9 P | 2.30 | |
| 16 | 49.0 | .455 | 77.0 | N.N.W. | 139 | 1.5 | 17 | 12 M | | | | |
| 17 | 44.0 | .365 | 78.5 | S.W. | 38 | 0.5 | 10 | 2 P | | | | |
| 18 | 48.5 | .403 | 86.5 | S.S.W. | 66 | 1.0 | 14 | 3 P | 3 P | 12 P | .10 | |
| 19 | 41.0 | .351 | 74.0 | N.N.W. | 102 | 1.5 | 17 | 7 A | 0 A | 2 A | .01 | |
| 20 | 47.5 | .400 | 84.0 | S.S.W. | 67 | 0.5 | 10 | 11 A | | | | |
| 21 | 50.5 | .420 | 91.0 | S.S.W. | 136 | 3.5 | 26 | 1 P | | | | |
| 22 | 58.0 | .545 | 88.0 | S.S.W. | 149 | 2.0 | 20 | 2 P | | | | |
| 23 | 59.0 | .557 | 92.0 | S. | 159 | 2.0 | 20 | 4*P | 8 A | 8 P | 1.12 | |
| 24 | 54.0 | .482 | 85.5 | W.S.W. | 109 | 3.0 | 24 | 10 A | | | | |
| 25 | 47.5 | .461 | 72.5 | N.W. | 111 | 2.5 | 26 | 11 A | | | | |
| 26 | 42.5 | .378 | 74.0 | W.S.W. | 98 | 1.5 | 17 | 10 A | | | | |
| 27 | 56.0 | .594 | 77.5 | S. | 128 | 1.5 | 17 | 2 P | | | | |
| 28 | 61.5 | .636 | 87.0 | S. | 218 | 3.0 | 24 | 2 P | 10 P | | T | |
| 29 | 59.0 | .536 | 88.5 | W. | 320 | 9.5 | 44 | 2 P | 1 P | 11 P | 1.26 | |
| 30 | 36.5 | .327 | 67.0 | N. | 271 | 4.0 | 28 | 9 A | | | | |

**Rain or melted snow at base of tower.

*Included in following day.

## REMARKS

The weather during September was generally seasonable, and more pleasant than any of the summer months preceding it. More than one-half the days were clear and only four were recorded as cloudy. The large amount of sunshine aided the maturing of the fall crops and the absence of heavy frosts extended the growing season to the close of the month, giving corn ample time to mature. A few traces of frost were noted after the middle of the month but they were so light that no damage was done.

An analysis of the weather records for the month shows the following features: All the barometer records were nearly normal and changes in pressure were rather slow. Nearly one-half the time the wind was in the southwest quadrant. The total wind movement was about ten per cent more than the normal, although only one gale was registered on the pressure chart.

The maximum and minimum temperatures were both a few degrees above the normals for these records, while the mean hourly temperature was slightly below the normal for this station, The range of temperature on the 14th was unusually large.

The mean dew point was slightly below the normal and the relative humidity rather high.

The total precipitation was an inch more than usual. Nearly the whole amount fell during three heavy storms,—the one on tho 15th being the most severe.

J. E. OSTRANDER, Meteorologist.

J. S. SIMS, Observer.

BULLETIN No. 334. OCTOBER, 1916

# Meteorological Observations
AT THE
# MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.
*Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.*
*Height of Wind Instruments 72 ft.*

## MONTHLY SUMMARY.

### **Pressure.** In inches.

| | |
|---|---|
| Maximum reduced to freezing, | 30.22, 18th, 10 P |
| Minimum reduced to freezing, | 29.21, 17th, 4 A |
| Reduced† maximum reading, | 30.53, 18th, 10 P |
| Reduced† minimum reading, | 29.50, 17th, 4 A |
| Mean semi-daily reduced | 30.131 |
| Monthly range | 1.03 |

### ***Air Temperature.** In Degrees Fahr.

| | |
|---|---|
| Highest | 84.0, 8th, 3:30 P |
| Lowest | 25.5, 18th, 6 A |
| Mean hourly | 50.9 |
| Mean of means of max. and min. | 51.7 |
| Mean sensible (wet bulb) | 44.9 |
| Monthly range | 58.5 |
| Highest mean daily | 67.8, 20th |
| Lowest mean daily | 39.6, 18th |
| Mean maximum | 65.2 |
| Mean minimum | 38.1 |
| Mean daily range | 27.1 |
| Greatest daily range | 43.0, 8th |
| Least daily range | 9.5, 20th |

### **Humidity.**

| | |
|---|---|
| Mean dew point | 41.3 |
| Mean force of vapor | .360 |
| Mean relative humidity | 78.4 |

### **Precipitation.** In inches.

| | |
|---|---|
| Total precipitation, in inches | 1.01 |
| Number of days on which .01 inch or more rain fell | 3 |

### **Wind.**

| | |
|---|---|
| Total movement | 4176 m |
| Greatest daily movement | 422m, 17th |
| Least daily movement | 3m, 3d |
| Mean daily movement | 135 m |
| Mean hourly velocity | 5.6 m |

Maximum pressure per square foot, 20.01 lbs = 63m per hour, 17th, 11A, W.N.W.
Maximum velocity for 5 minutes, 42m per hour, 17th, 2P, W.N.W.
Prevailing direction, West Northwest.

Summary.

| | |
|---|---|
| North Northwest | 13 per cent |
| West | 16 " " |
| West Southwest | 10 " " |
| South Southwest | 10 " " |
| Northwest | 13 " " |
| North | 16 " " |
| Other directions | 22 " " |

### **Weather.**

| | |
|---|---|
| Mean cloudiness observed | 43 per cent |
| Total cloudiness recorded by the Sun Thermometer | 113 hours = 33 per cent |
| Number of clear days | 14 |
| Number of fair days | 11 |
| Number of cloudy days | 6 |

### **Bright Sunshine.**

Number hours recorded, 228 hrs, = 67 per cent

**Rain,** 9th, 13th, 19th, 20th, 21st, 25th, 29th, 31st.

**Frosts,** 2d, 3d, 12th, 18th, 23d, 24th, 27th.

**Gales,** 35 or more miles per hour. 41m, 13th, S.W.; 39m, 14th, N.W.; 63m, 17th, W.N.W.; 36m, 19th, E.S.E.; 46m, 20th, S.; 38m, 26th, N.W.

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* Temperature in ground shelter.

† Reduced to freezing and sea-level.

# DAILY SUMMARY.

| Day. | Barometer Reduced to Sea Level. | | | Temperature. Ground Shelter. | | | | | | | No. Hours of Bright Sunshine. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Maximum | Minimum. | Mean. Semi-daily. | Maximum | Time. | Minimum. | Time. | Mean of Max. and Min. | Mean Hourly Draper. | Mean Sensible Wet Bulb. | |
| 1 | 30.39 | 30.25 | 30.390 | 65.5 | 3:30 P | 34.5 | 6 A | 50.0 | 47.6 | 42.7 | 10.2 |
| 2 | 30.45 | 30.27 | 30.388 | 69.5 | 4 P | 34.0 | 6:30 A | 51.7 | 49.1 | 43.0 | 10.7 |
| 3 | 30.29 | 30.20 | 30.279 | 74.5 | 3:30 P | 35.0 | 6:30 A | 54.7 | 52.6 | 47.5 | 9.7 |
| 4 | 30.36 | 30.25 | 30.352 | 71.0 | 3:30 P | 45.0 | 0 A | 58.0 | 54.5 | 50.3 | 7.8 |
| 5 | 30.39 | 30.15 | 30.295 | 80.0 | 3 P | 42.0 | 3:30 A | 61.0 | 58.0 | 51.3 | 8.2 |
| 6 | 30.15 | 29.94 | 30.065 | 79.5 | 2 P | 55.5 | 5:30 A | 67.5 | 64.6 | 59.3 | 6.0 |
| 7 | 30.19 | 30.06 | 30.167 | 75.0 | 4 P | 47.0 | 6:30 A | 61.0 | 57.0 | 51.0 | 10.0 |
| 8 | 30.11 | 29.84 | 30.004 | 84.0 | 3:30 P | 41.0 | 6 A | 62.5 | 60.8 | 54.3 | 8.7 |
| 9 | 30.00 | 29.66 | 29.851 | 77.0 | 2 P | 43.0 | 12 P | 60.0 | 62.7 | 55.0 | 3.5 |
| 10 | 30.23 | 30.00 | 30.196 | 53.0 | 2 P | 34.5 | 6:30 A | 43.7 | 46.5 | 36.5 | 10.5 |
| 11 | 30.18 | 30.11 | 30.147 | 58.0 | 3:30 P | 37.0 | 1 A | 47.5 | 45.9 | 42.3 | 5.3 |
| 12 | 30.32 | 30.18 | 30.279 | 67.0 | 3 P | 31.0 | 6 A | 49.0 | 47.7 | 40.3 | 9.5 |
| 13 | 30.18 | 29.63 | 29.845 | 63.0 | 10:30 A | 43.0 | 1:30 A | 53.0 | 53.8 | 51.7 | 1.8 |
| 14 | 30.13 | 29.73 | 30.057 | 54.0 | 3 P | 33.0 | 12 P | 43.5 | 43.3 | 36.7 | 9.6 |
| 15 | 30.13 | 29.81 | 29.990 | 62.5 | 2 P | 32.5 | 6:30 A | 47.5 | 48.1 | 37.0 | 7.9 |
| 16 | 29.81 | 29.64 | 29.782 | 65.0 | 3 P | 49.0 | 7 A | 57.0 | 55.9 | 50.0 | 5.3 |
| 17 | 30.24 | 29.50 | 29.847 | 62.0 | 6 A | 33.5 | 12 P | 47.7 | 50.0 | 45.0 | 7.2 |
| 18 | 30.53 | 30.24 | 30.486 | 56.0 | 2:30 P | 25.5 | 6 A | 40.7 | 39.6 | 35.7 | 9.5 |
| 19 | 30.51 | 29.76 | 30.121 | 65.0 | 12 P | 33.5 | 3 A | 49.3 | 46.5 | 39.0 | 0.0 |
| 20 | 29.80 | 29.61 | 29.723 | 74.5 | 2:30 P | 65.0 | 6 A | 69.7 | 67.8 | 66.0 | 3.8 |
| 21 | 29.91 | 29.62 | 29.770 | 69.0 | 2 P | 42.0 | 12 P | 55.5 | 60.4 | 50.3 | 7.1 |
| 22 | 30.37 | 29.91 | 30.205 | 56.5 | 2:30 P | 33.0 | 7 A | 44.7 | 43.8 | 37.3 | 9.3 |
| 23 | 30.52 | 30.37 | 30.459 | 58.0 | 3:30 P | 30.0 | 7 A | 44.0 | 42.9 | 35.5 | 9.0 |
| 24 | 30.37 | 30.25 | 30.307 | 56.5 | 4 P | 28.0 | 7 A | 42.3 | 42.0 | 35.7 | 8.8 |
| 25 | 30.27 | 29.84 | 30.109 | 62.5 | 1:30 P | 31.0 | 6 A | 46.7 | 47.4 | 41.5 | 8.5 |
| 26 | 30.12 | 29.75 | 29.967 | 56.0 | 2 P | 35.5 | 12 P | 45.7 | 49.8 | 40.5 | 9.3 |
| 27 | 30.19 | 30.04 | 30.134 | 56.5 | 3 P | 26.5 | 7 A | 41.5 | 41.0 | 34.0 | 8.8 |
| 28 | 30.37 | 30.10 | 30.327 | 62.5 | 3:30 P | 34.5 | 4 A | 48.5 | 45.9 | 42.5 | 9.8 |
| 29 | 30.44 | 30.24 | 30.392 | 60.5 | 1:30 P | 32.0 | 5:30 A | 46.3 | 46.2 | 41.5 | 7.2 |
| 30 | 30.24 | 30.05 | 30.152 | 65.0 | 3 P | 47.5 | 4:30 A | 56.3 | 54.7 | 52.3 | 3.3 |
| 31 | 30.05 | 29.91 | 29.985 | 62.5 | 2:30 P | 46.5 | 3 A | 51.5 | 51.5 | 48.7 | 2.0 |

# DAILY SUMMARY.

| Day. | Humidity. | | | Wind. | | | | | Precipitation. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Total in Inches. | |
| | Mean Dew Point. | Mean Force vapor. | Mean Relative Humidity. | Prevailing Direction. | Total Movement in Miles. | Maximum Pressure Per Square Ft | Miles per Hour. | Time. | Beginning. | Ending. | Rain.** | Snow. |
| 1 | 36.0 | .318 | 69.5 | N. | 185 | 3.0 | 24 | 9 A | | | | |
| 2 | 41.5 | .299 | 86.5 | N. | 37 | 0.0 | — | — | | | | |
| 3 | 45.5 | .364 | 85.0 | N. | 3 | 0.0 | — | — | | | | |
| 4 | 48.0 | .401 | 85.0 | N. | 6 | 0.0 | — | — | | | | |
| 5 | 49.0 | .428 | 86.0 | W. | 47 | 0.5 | 10 | 7 P | | | | |
| 6 | 58.5 | .525 | 93.0 | W. | 123 | 1.0 | 14 | 3 P | | | | |
| 7 | 48.5 | .406 | 86.0 | N.N.W. | 23 | 0.5 | 10 | 11 A | | | | |
| 8 | 52.0 | .492 | 84.0 | W.S.W. | 58 | 0.5 | 10 | 3 P | | | | |
| 9 | 51.5 | .509 | 78.5 | N.W. | 198 | 5.0 | 32 | 9 P | 12 M | | T | |
| 10 | 31.5 | .243 | 73.5 | N.N.W. | 267 | 5.5 | 33 | 3 A | | | | |
| 11 | 39.5 | .298 | 80.0 | W. | 107 | 1.0 | 14 | 2 P | | | | |
| 12 | 36.0 | .550 | 73.0 | S.S.W. | 48 | 0.0 | — | — | | | | |
| 13 | 49.5 | .420 | 85.0 | S.S.W. | 307 | 8.5 | 41 | 5 P | 2 P | 7 P | .07 | |
| 14 | 31.0 | .253 | 68.5 | N.N.W. | 305 | 7.5 | 39 | 2 A | | | | |
| 15 | 29.5 | .265 | 64.0 | W.S.W. | 193 | 3.0 | 24 | 6 P | | | | |
| 16 | 47.0 | .409 | 78.0 | W. | 178 | 2.5 | 22 | 11 P | | | | |
| 17 | 39.0 | .374 | 68.0 | W.N.W. | 422 | 20.0 | 63 | 11 A | | | | |
| 18 | 33.5 | .235 | 81.5 | E.N.E. | 28 | 0.5 | 10 | 8 P | | | | |
| 19 | 42.0 | .308 | 90.5 | N.E. | 79 | 6.5 | 36 | 2 P | 8 A | 11 P | .92 | |
| 20 | 65.5 | .656 | 95.0 | S.S.W. | 339 | 10.5 | 46 | 12 P | 5 P | | T | |
| 21 | 46.5 | .420 | 78.0 | N.W. | 353 | 5.0 | 32 | 1 A | 6 A | 8 A | .02 | |
| 22 | 30.0 | .263 | 64.0 | N.W. | 112 | 2.0 | 20 | 3 P | | | | |
| 23 | 30.5 | .240 | 71.5 | N. | 58 | 0.0 | — | — | | | | |
| 24 | 32.0 | .237 | 77.0 | E.N.E. | 18 | 0.0 | — | — | | | | |
| 25 | 37.0 | .313 | 74.5 | S.W. | 120 | 4.5 | 30 | 6 P | 9 P | | T | |
| 26 | 31.0 | .321 | 56.5 | N.W. | 274 | 7.0 | 38 | 12 M | | | | |
| 27 | 27.5 | .233 | 66.5 | W. | 70 | 1.0 | 14 | 8 P | | | | |
| 28 | 37.0 | .316 | 72.0 | N.N.W. | 84 | 0.5 | 10 | 1 P | | | | |
| 29 | 37.5 | .302 | 79.0 | W.S.W. | 73 | 0.0 | — | — | 10 P | | T | |
| 30 | 51.0 | .411 | 92.0 | S. | 43 | 0.0 | — | — | | | | |
| 31 | 47.0 | .364 | 90.0 | S. | 18 | 0.0 | — | — | 9 P | 12 P | T | |

**Rain or meltedsnow at base of tower. *Included in following day.

## REMARKS

During the month ideal autumn weather was in evidence almost the whole time. With only three days showing a measurable amount of rainfall and nearly one-half the days recorded as clear, and more than one-third of the days fair, there was but little room left for improvement. The large amount of sunshine, mild temperature and rather low humidity, combined to make weather conditions most agreeable,

The various weather elements show a number of features of interest when their records are compared with the normals at this station.

The mean barometer was considerably higher than the normal, and the range of pressure slightly smaller than usual. While the maximum and minimum records were both nearly normal, the interval between the two records was unusually short. The total wind movement was a little more than usual, and several gales of moderate intensity were registered on the pressure chart. The wind direction was more nearly normal than during the last few months.

The maximum temperature was five degrees higher than the normal and the minimum about two degrees higher, giving a slightly greater range than usual. The mean temperature was slightly above the normal.

The mean dew point and relative humidity were both nearly normal.

The total precipitation was practically one inch, making it the dryest month so far this year. Owing, however, to the large precipitation which occurred during the summer, the absence of much rain was not particularly felt.

J. E. OSTRANDER, Meteorologist.

J. S. SIMS, Observer.

BULLETIN No. 335. NOVEMBER, 1916

# Meteorological Observations
AT THE
# MASSACHUSETTS
# AGRICULTURAL EXPERIMENT
# STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.
*Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.*
*Height of Wind Instruments 72 ft.*

## MONTHLY SUMMARY.

### **Pressure.** In inches.

| | |
|---|---|
| Maximum reduced to freezing, | 30.23, 7th, 8 A |
| Minimum reduced to freezing, | 28.72, 23d, 12 P |
| Reduced† maximum reading, | 30.55, 7th, 8 A |
| Reduced† minimum reading, | 29.02, 23d, 12 P |
| Mean semi-daily reduced | 30.101 |
| Monthly range | 1.53 |

### ***Air Temperature.** In Degrees Fahr.

| | |
|---|---|
| Highest | 64.0, 9th, 4 P |
| Lowest | 12.5, 22d, 7 A |
| Mean hourly | 37.4 |
| Mean of means of max. and min. | 38.1 |
| Mean sensible (wet bulb) | 33.9 |
| Monthly range | 51.5 |
| Highest mean daily | 52.8, 9th |
| Lowest mean daily | 22.9, 27th |
| Mean maximum | 48.0 |
| Mean minimum | 28.1 |
| Mean daily range | 19.9 |
| Greatest daily range | 34.5, 22d |
| Least daily range | 7.5, 12th |

### **Humidity.**

| | |
|---|---|
| Mean dew point | 30.5 |
| Mean force of vapor | .222 |
| Mean relative humidity | 82.3 |

### **Precipitation.** In inches.

| | |
|---|---|
| Total precipitation, in inches | 3.29 |
| Total snow, in inches | 1½ |
| Number of days on which .01 inch or more rain fell | 10 |

### **Wind.**

| | |
|---|---|
| Total movement | 3929 m |
| Greatest daily movement | 382m, 24th |
| Least daily movement | 1m, 17th |
| Mean daily movement | 131 m |
| Mean hourly velocity | 5.5 m |

Maximum pressure per square foot, 22.5 lbs = 67m per hour, 23d, 8 P, S.S.W.
Maximum velocity for 5 minutes, 40m per hour, 23d, 9P, S.S.W.
Prevailing direction, West.

Summary.

| | |
|---|---|
| West Southwest | 10 per cent |
| West | 23 " " |
| West Northwest | 17 " " |
| South | 13 " " |
| North | 10 " " |
| Other directions | 27 " " |

### **Weather.**

| | |
|---|---|
| Mean cloudiness observed | 51 per cent |
| Total cloudiness recorded by the Sun Thermometer | 152 hours = 52 per cent |
| Number of clear days | 5 |
| Number of fair days | 13 |
| Number of cloudy days | 12 |

### **Bright Sunshine.**

Number hours recorded, 141 hrs, = 48 per cent

**Rain,** 4th, 5th, 9th, 13th, 14th, 23d, 29th, 30th.

**Snow,** 15th, 16th, 17th.

**Gales,** 35 or more miles per hour. 38m, 9th, S.S.W.; 36m, 11th, W.N.W.; 36m, 16th, N.W.; 67m, 23d, S.S.W.; 39m, 24th, W.; 41m, 25th, W.

* Temperature in ground shelter.

† Reduced to freezing and sea-level.

# DAILY SUMMARY.

| Day. | Barometer Reduced to Sea Level. | | | Temperature. Ground Shelter. | | | | | | | No. Hours of Bright Sunshine. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Maximum | Minimum. | Mean. Semi-daily. | Maximum | Time. | Minimum. | Time. | Mean of Max. and Min. | Mean Hourly Draper. | Mean Sensible Wet Bulb. | |
| 1 | 29.98 | 29 82 | 29.903 | 60.0 | 2:30 P | 43.0 | 12 P | 51.5 | 50.8 | 47.3 | 3.0 |
| 2 | 30 03 | 29.98 | 30 025 | 59.5 | 3 P | 37.0 | 7 A | 48.3 | 46.7 | 37.5 | 8.3 |
| 3 | 30.17 | 29 96 | 30.094 | 51.0 | 1 P | 32 0 | 6 A | 41.5 | 41.6 | 39 0 | 7.7 |
| 4 | 30.19 | 30.11 | 30.158 | 55.0 | 3 P | 31.0 | 7 A | 43.0 | 42.4 | 41.0 | 8.3 |
| 5 | 30.43 | 30.11 | 30.292 | 49.0 | 0 A | 35.5 | 7 P | 42.3 | 37 4 | 37.3 | 0.0 |
| 6 | 30.51 | 30 43 | 30 489 | 52.5 | 4 P | 30.5 | 8:30 A | 41.5 | 38.2 | 31.0 | 9.0 |
| 7 | 30.55 | 30 40 | 30 496 | 56 5 | 3 P | 24.0 | 7:30 A | 40.3 | 38.1 | 32.7 | 7.3 |
| 8 | 30.40 | 30.08 | 30 234 | 61.0 | 3 P | 34.0 | 6 A | 47.5 | 45.6 | 40 7 | 7.0 |
| 9 | 30.08 | 29 60 | 29.804 | 64.0 | 4 P | 41.5 | 7 A | 52.7 | 52.8 | 48.7 | 7.0 |
| 10 | 29.91 | 29.72 | 29 957 | 55 5 | 12 M | 36 0 | 12 P | 45.7 | 46.4 | 38.3 | 7.5 |
| 11 | 30.46 | 29 91 | 30.310 | 50 5 | 2 P | 29.0 | 12 P | 39.7 | 40.9 | 36.5 | 9.5 |
| 12 | 30.54 | 30 24 | 30 433 | 35.0 | 12 P | 27.5 | 7:30 A | 31.3 | 31.9 | 30.3 | 0.0 |
| 13 | 30.24 | 29 72 | 30.058 | 42.5 | 3 P | 34.0 | 3 A | 38.3 | 37.4 | 36.0 | 0 0 |
| 14 | 30.14 | 29.70 | 29 912 | 40.0 | 0 A | 22.0 | 12 P | 31.0 | 32.6 | 30.5 | 0.5 |
| 15 | 30.16 | 30 04 | 30.108 | 38.5 | 3 P | 21 0 | 5 A | 29 7 | 27.3 | 23.7 | 6.9 |
| 16 | 30.23 | 30.03 | 30.157 | 35 5 | 1 P | 20.5 | 7 A | 28.0 | 27.6 | 23.7 | 7.0 |
| 17 | 30 23 | 29 92 | 30.109 | 28 0 | 3 P | 17.0 | 3 A | 22 5 | 23.9 | 23.7 | 0 0 |
| 18 | 29 95 | 29 86 | 29 926 | 41.0 | 2 P | 23.5 | 5:30 A | 32.3 | 31.3 | 29.0 | 5.5 |
| 19 | 29 86 | 29.75 | 29.767 | 49.5 | 3 P | 27.0 | 12 P | 38 3 | 36.0 | 31.3 | 7.5 |
| 20 | 30.13 | 29.77 | 29 927 | 46.0 | 1 P | 26 0 | 12 P | 36.0 | 34.9 | 32.3 | 2.3 |
| 21 | 30.41 | 30.13 | 30.356 | 37.5 | 3:30 P | 18.0 | 12 P | 27 7 | 26.2 | 22.3 | 8 5 |
| 22 | 30.40 | 30 03 | 30.188 | 47 0 | 3 P | 12 5 | 7 A | 29.7 | 28.2 | 23 3 | 7 1 |
| 23 | 30.03 | 29.02 | 29 670 | 57.5 | 12 P | 23 5 | 6 A | 40.5 | 36.0 | 40.5 | 0 0 |
| 24 | 29.75 | 29 02 | 29 527 | 57 5 | 0 A | 33 0 | 12 P | 45.3 | 44.6 | 40.3 | 0.8 |
| 25 | 30.21 | 29.75 | 30 085 | 33 0 | 0 A | 19 0 | 10 P | 26.0 | 27.0 | 24 5 | 6.0 |
| 26 | 30.48 | 30 21 | 30.438 | 29.0 | 3:30 P | 19.5 | 10 P | 24.3 | 22.9 | 19.0 | 6 9 |
| 27 | 30.46 | 30.21 | 30.332 | 51.0 | 2 P | 20 0 | 0 A | 35.5 | 36.5 | 30 5 | 6.2 |
| 28 | 30.32 | 30.15 | 30.263 | 47.5 | 3:30 P | 29 5 | 7:30 A | 38.5 | 39.9 | 34.3 | 1.7 |
| 29 | 30.25 | 30.00 | 30.174 | 56.5 | 1:30 P | 38 0 | 1 A | 47.3 | 47 9 | 46.0 | 0.0 |
| 30 | 30.00 | 29 77 | 29.835 | 54.0 | 5 A | 39.0 | 12 P | 46.5 | 48.1 | 48.3 | 0.0 |

# DAILY SUMMARY.

| Day. | Humidity. | | | Wind. | | | | | Precipitation. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Mean Dew Point. | Mean Force vapor. | Mean Relative Humidity. | Prevailing Direction. | Total Movement in Miles. | Maximum Pressure Per Square Ft | Miles per Hour. | Time. | Beginning. | Ending. | Total in Inches. Rain.** | Total in Inches. Snow. |
| 1 | 46.0 | .336 | 94.5 | W. | 116 | 3.0 | 24 | 3 P | | | | |
| 2 | 32.0 | .260 | 70.5 | W. | 181 | 3.5 | 26 | 11 A | | | | |
| 3 | 36.5 | .255 | 84.0 | N.W. | 182 | 5.0 | 32 | 2 P | | | | |
| 4 | 40.0 | .265 | 92.0 | N. | 87 | 1.0 | 14 | 11 P | 10 P | 12 P | .13 | |
| 5 | 35.5 | .230 | 91.5 | N.E. | 116 | 0.5 | 10 | 3 P | 6 A | 1 P | .37 | |
| 6 | 27.5 | .186 | 82.5 | N. | 92 | 0.0 | — | — | | | | |
| 7 | 28.5 | .213 | 78.5 | E. | 36 | 0.0 | — | — | | | | |
| 8 | 39.5 | .272 | 94.0 | S. | 113 | 1.5 | 17 | 9 P | | | | |
| 9 | 46.5 | .386 | 84.0 | S.S.W. | 151 | 7.0 | 38 | 9 P | 10 P | 11 P | .07 | |
| 10 | 33.0 | .261 | 74.5 | W.N.W. | 229 | 3.0 | 24 | 11 A | | | | |
| 11 | 31.5 | .257 | 73.5 | W.N.W. | 233 | 6.5 | 36 | 10 A | | | | |
| 12 | 28.0 | .181 | 82.5 | N.W. | 10 | 0.0 | — | — | | | | |
| 13 | 34.0 | .222 | 88.5 | W N.W. | 40 | 0.0 | — | — | 8 P | 12 P | .13 | |
| 14 | 29.0 | .177 | 92.0 | N.N.W. | 134 | 2.5 | 22 | 3 P | 0 A | 10 A | .20 | |
| 15 | 20.0 | .136 | 81.5 | N.N.E. | 107 | 0.5 | 10 | 11 A | 11 P | 12 P | T | T |
| 16 | 21.0 | .135 | 84.5 | W.N.W. | 157 | 6.5 | 36 | 12 M | 0 A | 3 A | .02 | ¼ |
| 17 | 21.5 | .134 | 87.5 | W. | 1 | 2.0 | 20 | 10 P | 7 A | 12 P | .05 | 1¼ |
| 18 | 26.0 | .169 | 84.5 | W. | 35 | 1.0 | 14 | 2 P | | | | |
| 19 | 27.5 | .189 | 80.5 | S.W. | 47 | 1.0 | 14 | 12 M | | | | |
| 20 | 28.5 | .200 | 81.0 | W.N.W. | 38 | 5.0 | 32 | 10 P | | | | |
| 21 | 17.0 | .131 | 75.0 | N. | 192 | 3.5 | 26 | 7 A | | | | |
| 22 | 18.5 | .147 | 77.0 | W. | 25 | 0.0 | — | — | | | | |
| 23 | 38.0 | .300 | 89.5 | S. | 43 | 22.5 | 67 | 8 P | 10 A | 10 P | 1.34 | |
| 24 | 37.5 | .276 | 83.0 | W. | 382 | 7.5 | 39 | 1 P | | | | |
| 25 | 21.5 | .145 | 79.5 | W. | 364 | 8.5 | 41 | 10 A | | | | |
| 26 | 10.5 | .116 | 66.0 | W.S.W. | 210 | 5.0 | 32 | 11 A | | | | |
| 27 | 23.5 | .198 | 64.5 | W.S.W. | 225 | 3.0 | 24 | 5 A | | | | |
| 28 | 28.0 | .228 | 69.5 | S. | 160 | 1.5 | 17 | 3 P | | | | |
| 29 | 45.5 | .326 | 96.5 | S. | 83 | 4.5 | 30 | 12 P | 6 P | 12 P | 09 | |
| 30 | 44.0 | .340 | 87.5 | W.S.W. | 140 | 5.0 | 32 | 6 A | 0 A | 3 P | .89 | |

**Rain or meltedsnow at base of tower. *Included in following day.

## REMARKS

The weather conditions during November were generally seasonable, and features of unusual interest were but few. A small amount of snow occurred about the middle of the month, which was rather early, and ice of some little thickness was formed about a week later. More than two-thirds of the total precipitation occurred during the last third of the month.

An examination in detail of the records of the several weather elements shows the following features of more or less interest: The mean dew point was rather high, while the maximum was practically normal. The minimum pressure was recorded at midnight of the 23d, following the heaviest rainstorm of the month, which occurred while the barometer was falling rapidly. The recovery of pressure the next day was almost as rapid as the fall had been. The total wind movement was more than ten per cent less than the normal, and the largest daily movements were from the West.

Both the maximum and minimum temperatures were nearly normal, while the mean for the month was about one degree lower than usual. The greatest daily range was on the date of lowest temperature.

The mean dew point was normal, while the relative humidity was more than six points higher than usual.

The total precipitation was slightly more than the normal, and more than three times the amount of the preceding month. The snowfall was more than usual so early in the season.

The amount of cloudiness recorded and the amount obtained by estimation at the 8 A M. and 8 P. M. observations were unusually concordant. The percentage of sunshine was slightly more than the average.

J. E. OSTRANDER, Meteorologist.

J. S. SIMS, Observer.

**BULLETIN No. 336. DECEMBER, 1916**

# Meteorological Observations
AT THE
# MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.
*Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.*
*Height of Wind Instruments 72 ft.*

## MONTHLY SUMMARY.

### Pressure. In inches.

| | |
|---|---|
| Maximum reduced to freezing, | 30.15, 26th, 3 P |
| Minimum reduced to freezing, | 28.65, 22d, 2 P |
| Reduced† maximum reading, | 30.47, 26th, 3 P |
| Reduced† minimum reading, | 28.96, 22d, 2 P |
| Mean semi-daily reduced | 29.932 |
| Monthly range | 1.51 |

### *Air Temperature. In Degrees Fahr.

| | |
|---|---|
| Highest | 54.5, 5th, 3 P |
| Lowest | 0.0, 31st, 6 A |
| Mean hourly | 26.5 |
| Mean of means of max. and min. | 26.5 |
| Mean sensible (wet bulb) | 24.0 |
| Monthly range | 54.5 |
| Highest mean daily | 47.5, 5th |
| Lowest mean daily | 10.4, 30th |
| Mean maximum | 33.7 |
| Mean minimum | 19.5 |
| Mean daily range | 14.2 |
| Greatest daily range | 24.5, 18th |
| Least daily range | 3.0, 23d |

### Humidity.

| | |
|---|---|
| Mean dew point | 20.3 |
| Mean force of vapor | .149 |
| Mean relative humidity | 81.7 |

### Precipitation. In inches.

| | |
|---|---|
| Total precipitation, in inches | 2.85 |
| Total snow, in inches | 9½ |
| Number of days on which .01 inch or more rain fell | 10 |
| **Days of Sleighing** | 20 |

### Wind.

| | |
|---|---|
| Total movement | 4026 m |
| Greatest daily movement | 387m, 23d |
| Least daily movement | 0m, 4th |
| Mean daily movement | 130 m |
| Mean hourly velocity | 5.4 m |

Maximum pressure per square foot, 15.5 lbs = 56m per hour, 22d, 12 P, W.N.W.

Maximum velocity for 5 minutes 32m per hour, 22d, 9P, W N.W.

Prevailing direction, West Northwest.

Summary.

| | |
|---|---|
| North Northwest | 16 per cent |
| West | 13 " " |
| North | 10 " " |
| Northwest | 19 " " |
| West Northwest | 23 " " |
| Other directions | 19 " " |

### Weather.

| | |
|---|---|
| Mean cloudiness observed | 53 per cent |
| Total cloudiness recorded by the Sun Thermometer | 156 hours = 55 per cent |
| Number of clear days | 6 |
| Number of fair days | 11 |
| Number of cloudy days | 14 |

### Bright Sunshine.

Number hours recorded, 127 hrs, = 45 per cent

**Rain**, 4th, 5th, 9th, 22d, 27th, 28th.

**Snow**, 11th, 12th, 15th, 21st, 25th, 28th.

**Hail**, 27th, 28th.

**Gales**, 35 or more miles per hour. 45m, 6th, N.N W.; 35m, 12th, W.N.W.; 39m, 13th, W.N.W.; 43m, 16th, N.W.; 56m, 22d, W.N.W.; 45m, 25th, W.N. W.; 37m, 28th, W.N.W.; 35m, 29th, W.N.W.

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*Temperature in ground shelter.

† Reduced to freezing and sea-level.

# DAILY SUMMARY.

| Day. | Barometer Reduced to Sea Level. | | | Temperature. Ground Shelter. | | | | | | | No. Hours of Bright Sunshine. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Maximum | Minimum. | Mean. Semi-daily. | Maximum | Time. | Minimum. | Time. | Mean of Max. and Min. | Mean Hourly Draper. | Mean Sensible Wet Bulb. | |
| 1 | 29.85 | 29.60 | 29.769 | 41.5 | 2 P | 33.5 | 7 A | 37.5 | 36.0 | 32.3 | 5.3 |
| 2 | 29.99 | 29.59 | 29.837 | 42.0 | 0:30 P | 30.0 | 1 A | 36.0 | 36.4 | 35.3 | 2.0 |
| 3 | 30.26 | 29.99 | 30.207 | 44.0 | 2 P | 31.0 | 12 P | 37.5 | 36.1 | 32.3 | 6.9 |
| 4 | 30.26 | 29.92 | 30.144 | 44.5 | 2 P | 37.0 | 11 P | 40.7 | 38.0 | 37.0 | 0.0 |
| 5 | 29.92 | 29.56 | 29.669 | 54.5 | 3 P | 38.0 | 0 A | 46.3 | 47.5 | 46.5 | 0 2 |
| 6 | 29.74 | 29.60 | 29.646 | 47.0 | 0 A | 36.0 | 3 P | 41.5 | 39.4 | 37.3 | 1.7 |
| 7 | 30 03 | 29.74 | 29.964 | 43 0 | 3:30 P | 31.0 | 12 P | 37.0 | 36.8 | 32.7 | 7.7 |
| 8 | 30.10 | 30 03 | 30.078 | 50.5 | 4 P | 26.5 | 6 A | 38.5 | 33.9 | 28.7 | 7.6 |
| 9 | 30.06 | 29.86 | 29 953 | 38.5 | 3 P | 27.0 | 4:30 A | 32.7 | 33.0 | 34.7 | 0.0 |
| 10 | 30.16 | 29.94 | 30.099 | 37.0 | 1 P | 28.0 | 7:30 A | 32.5 | 31.5 | 29.5 | 4.0 |
| 11 | 30.16 | 29.67 | 29.977 | 37.5 | 1:30 P | 22.5 | 5:30 A | 30.0 | 30.1 | 26.5 | 0.2 |
| 12 | 29.67 | 29.11 | 29.380 | 34.0 | 9 P | 25.0 | 2 P | 29.5 | 31.7 | 31.7 | 0 0 |
| 13 | 29.86 | 29.47 | 29.787 | 31.0 | 1 P | 14 0 | 12 P | 22.5 | 23.8 | 19.7 | 7.0 |
| 14 | 30.12 | 29.86 | 30.106 | 30.0 | 2:30 P | 7.5 | 6:30 A | 18.5 | 19.1 | 15.3 | 7.0 |
| 15 | 30.03 | 29 22 | 29.798 | 19.0 | 4 P | 14.5 | 4:30 A | 16.7 | 17.4 | 17.0 | 0.0 |
| 16 | 29.60 | 29 20 | 29.360 | 23.0 | 3 P | 11.0 | 12 P | 17.0 | 18.3 | 17.0 | 7.2 |
| 17 | 29.84 | 29 60 | 29 738 | 25.5 | 2 P | 8.0 | 12 P | 16.7 | 16.5 | 13.7 | 7 0 |
| 18 | 29.91 | 29.61 | 29.823 | 28.0 | 1:30 P | 3.5 | 6 A | 15.7 | 15.5 | 11.7 | 6.8 |
| 19 | 29.90 | 29.60 | 29.702 | 27.5 | 0:30 P | 14.5 | 11 P | 21.0 | 19.8 | 19.0 | 2.2 |
| 20 | 30.08 | 29.90 | 30.091 | 18.5 | 2:30 P | 4.0 | 7:30 A | 11.3 | 16.5 | 11.7 | 4.8 |
| 21 | 30.06 | 29.98 | 30.033 | 29.0 | 12 P | 14.0 | 0 A | 21.5 | 23.7 | 22.7 | 0.0 |
| 22 | 29.98 | 28.96 | 29.437 | 38.0 | 12 M | 24.5 | 12 P | 31.3 | 31.3 | 29.0 | 0.0 |
| 23 | 29.99 | 29.47 | 29.905 | 28.0 | 3 P | 25.0 | 8 A | 26.5 | 25.7 | 24.0 | 7.1 |
| 24 | 30.10 | 29.86 | 30.060 | 30.5 | 3 P | 21.5 | 5:30 A | 26.0 | 26 0 | 23 3 | 7.3 |
| 25 | 30.25 | 29.41 | 29.830 | 34.5 | 12 M | 19.0 | 12 P | 26.7 | 24.3 | 19.3 | 3.0 |
| 26 | 30 47 | 30 42 | 30.452 | 27.0 | 2:30 P | 6 5 | 8 A | 16.7 | 16.6 | 10.5 | 8.2 |
| 27 | 30.44 | 30.02 | 30.303 | 33.0 | 12 P | 17.0 | 0 A | 25.0 | 23.2 | 24.0 | 0.0 |
| 28 | 30.01 | 29.83 | 29.936 | 38.5 | 2 P | 25.0 | 12 P | 31 7 | 31.9 | 29.3 | 1.2 |
| 29 | 30.29 | 30.01 | 30.241 | 25.0 | 0 A | 8.0 | 12 P | 16.5 | 19.5 | 16.0 | 8.6 |
| 30 | 30.32 | 30.21 | 30.271 | 21.0 | 2:30 P | 1.0 | 6 A | 11.0 | 10 4 | 6.7 | 6.6 |
| 31 | 30.37 | 30.17 | 30.299 | 23.0 | 2 P | 0.0 | 6 A | 11.5 | 12.7 | 10.5 | 7.1 |

# DAILY SUMMARY.

| Day. | Humidity. | | | Wind. | | | | | Precipitation. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Mean Dew Point. | Mean Force vapor. | Mean Relative Humidity. | Prevailing Direction. | Total Movement in Miles. | Maximum Pressure Per Square Ft | Miles per Hour. | Time. | Beginning. | Ending. | Total in Inches. | |
| | | | | | | | | | | | Rain.** | Snow. |
| 1 | 28 5 | .196 | 81.0 | N.W. | 166 | 3.5 | 26 | 12 M | | | | |
| 2 | 31.5 | .224 | 78.5 | W. | 137 | 3.0 | 24 | 12 M | | | | |
| 3 | 28.5 | .197 | 81.5 | W.N.W. | 8 | 0.5 | 10 | 1 P | | | | |
| 4 | 33.5 | .226 | 85.0 | S.S.W. | 0 | 0.0 | — | — | 7 P | 12 P | T | |
| 5 | 43.5 | .350 | 81.5 | S.S.W. | 98 | 3.0 | 24 | 12 M | 0 A | 8 A | .05 | |
| 6 | 34.0 | .239 | 81.5 | W.N.W | 276 | 10.0 | 45 | 5 P | | | | |
| 7 | 27.5 | .206 | 74.5 | N.W. | 362 | 5.0 | 32 | 1 P | | | | |
| 8 | 23.5 | .175 | 74.5 | N.N.W. | 47 | 1.0 | 14 | 7 A | | | | |
| 9 | 33.5 | .204 | 95.5 | N. | 3 | 2.5 | 22 | 12 P | 2 P | 9 P | .25 | |
| 10 | 26.5 | .172 | 87.0 | N.W. | 229 | 5.0 | 32 | 5 A | | | | |
| 11 | 22.5 | .153 | 83.0 | W.S.W. | 57 | 3 0 | 24 | 7 P | 4 P | 12 P | .03 | ½ |
| 12 | 30.0 | .183 | 92.5 | W.N.W. | 51 | 6.0 | 35 | 12 P | 0 A | 9 P | 1.03 | 3¼ |
| 13 | 14 5 | .119 | 74.5 | W.N.W. | 244 | 7.5 | 39 | 7 A | | | | |
| 14 | 10.0 | .098 | 72.5 | W. | 54 | 2.5 | 22 | 3 P | | | | |
| 15 | 15.0 | .098 | 91.0 | N.W. | 68 | 2.0 | 20 | 10 P | 7 A | 10 P | .42 | 4¾ |
| 16 | 13.0 | .103 | 79.0 | W.N.W. | 327 | 9.0 | 43 | 1 P | | | | |
| 17 | 10.0 | .088 | 80.0 | W.N.W. | 116 | 2.0 | 20 | 3 P | | | | |
| 18 | 8.0 | .082 | 79.0 | N.N.W. | 23 | 1.5 | 17 | 9 A | | | | |
| 19 | 16.5 | .109 | 88 0 | N.N.W. | 147 | 4.0 | 28 | 9 A | | | | |
| 20 | 6 5 | .083 | 74.5 | W. | 16 | 0.0 | — | — | | | | |
| 21 | 20.0 | .129 | 84.5 | E. | 24 | 0.5 | 10 | 4 P | 6 A | 9 A | .04 | ¾ |
| 22 | 26.0 | .167 | 89.0 | N.N.W. | 164 | 15.5 | 56 | 12 P | 5 A | 5 P | .86 | |
| 23 | 17 5 | .141 | 71.0 | W. | 387 | 5.5 | 33 | 10 A | | | | |
| 24 | 20.0 | .133 | 84.0 | N.W. | 78 | 1.0 | 14 | 4 A | | | | |
| 25 | 13.0 | .117 | 70.0 | W.N.W. | 151 | 10.0 | 45 | 2 P | 0 A | 2 A | .02 | ¼ |
| 26 | 6.0 | .078 | 78.0 | N.N.W. | 161 | 3.5 | 26 | 10 P | | | | |
| 27 | 22.5 | .136 | 90.5 | N.N.E. | 90 | 1.5 | 17 | 0 A | 7 A | 12 P | .09 | |
| 28 | 26.5 | .169 | 89.0 | S.W. | 154 | 7.0 | 37 | 6 P | 0 A | 1 P | .06 | T |
| 29 | 10.5 | .100 | 75.5 | N.W. | 260 | 6.0 | 35 | 1 A | | | | |
| 30 | 3.0 | .066 | 80.0 | N. | 63 | 2.0 | 20 | 1 P | | | | |
| 31 | 7.0 | .077 | 86.0 | N. | 65 | 2.5 | 22 | 11 A | | | | |

**Rain or melted snow at base of tower. *Included in following day.

# Annual Summary for 1916.

### **Pressure.** In inches.

| | |
|---|---|
| Maximum reduced to freezing, | 30.31, Jan. 8th, 9 A.; Jan. 29th, 10 A. |
| Minimum reduced to freezing, | 28.45. Feb. 25th, 12 P. |
| Maximum reduced to freezing and sea-level, | 30.64, Jan. 8th, 9 A. |
| Minimum reduced to freezing and sea-level, | 28.76, Feb. 25th, 12 P. |
| Mean reduced to freezing and sea-level, | 30.006 |
| Annual range, | 1.88 |

### ***Air Temperature.** In degrees Fahr.

| | |
|---|---|
| Highest, | 95.5, Aug. 22d, 3:30P. |
| Lowest, | —16.0, Feb. 15th, 9A. |
| Mean hourly, | 46.0 |
| Mean of means of max. and min., | 46.4 |
| Mean sensible (wet bulb), | 42.2 |
| Annual range, | 111.5 |
| Highest mean daily, | 79.3, Aug. 22 |
| Lowest mean daily, | 1.3, Feb. 15 |
| Mean maximum, | 56.6 |
| Mean minimum, | 36.2 |
| Mean daily range, | 20.4 |
| Greatest daily range, | 43.5, Mar. 26 |
| Least daily range, | 3.0, Dec. 23 |

### **Humidity.**

| | |
|---|---|
| Mean dew point, | 38.4 |
| Mean force of vapor, | .370 |
| Mean relative humidity, | 80.3 |

### **Wind.**

| | |
|---|---|
| Prevailing direction, | West. |

Summary.

| | |
|---|---|
| Northwest, | 9 per cent |
| South Southwest | 14 " " |
| West, | 14 " " |
| South | 11 " " |
| West Northwest | 10 " " |
| North | 9 " " |
| Other directions, | 33 " " |
| Total movement, | 52,450 m |
| Greatest daily movement, | 519m., Feb. 28 |
| Least daily movement, | 0 m., Dec. 4 |
| Mean daily movement, | 143 m |
| Mean hourly velocity, | 6.0 m |

Maximum pressure per square foot, 25.0 lbs.=71 m. per hour, Jan 23, 1 A., W.

Maximum velocity for 5 minutes, 48 m. per hour, Apr. 15th, 10 A., N.

### **Precipitation.** In inches.

| | |
|---|---|
| Total precipitation, rain or melted snow, | 45.61 |
| Number of days on which .01 or more rain or melted snow fell, | 126 |
| Snow total in inches, | 59.5 |

### **Weather.**

| | |
|---|---|
| Mean cloudiness observed, | 53 per cent. |
| Total cloudiness recorded by Sun Thermometer, | 2418 hrs.=53 per cent. |
| Number of clear days, | 121 |
| Number of fair days, | 129 |
| Number of cloudy days, | 136 |

### **Bright Sunshine.**

Number of hours recorded, 2036 hrs.=47 per cent.

### **Dates of Frosts.**

| | |
|---|---|
| Last, | May 19th |
| First, | Sept. 17th |

### **Dates of Snow.**

| | |
|---|---|
| Last, | April 14th |
| First, | Nov. 15th |
| Total days of sleighing, | 99 |

### **Gales of 50 or More Miles Per Hour.**

Jan. 22d, 59m., W.; Jan. 23d. 71m., W.: Feb. 7th, 54m, W.N.W.; Feb 19th, 51m., W.; Feb. 28th, 57m., W N.W.: April 15th. 61m, N.; May 11th, 61 m, W.; May 12th, 62m, W.N.W.; Aug. 23d, 64m., S.S.W.; Oct. 17th 63m, W.N.W.; Nov. 23d, 67m, S.S.W.; Dec. 22d, 56m., W.N.W.

*Temperature in ground shelter.

J. E. OSTRANDER,
*Meteorologist.*

J. S. SIMS,
*Observer.*

**BULLETIN No. 337. JANUARY, 1917**

# Meteorological Observations

AT THE

# MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.

*Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.*

*Height of Wind Instruments 72 ft.*

## MONTHLY SUMMARY.

**Pressure.** In inches.

| | |
|---|---|
| Maximum reduced to freezing, | 30.42, 15th, 10 A |
| Minimum reduced to freezing, | 29.05, 10th, 5 P |
| Reduced† maximum reading, | 30.74, 15th, 10 A |
| Reduced† minimum reading, | 29.36, 10th, 5 P |
| Mean semi-daily reduced | 30.007 |
| Monthly range | 1.38 |

***Air Temperature.** In Degrees Fahr.

| | |
|---|---|
| Highest | 47,5, 14th, 8:30 A |
| Lowest | −3.5, 27th, 6 A |
| Mean hourly | 23.1 |
| Mean of means of max. and min. | 23.5 |
| Mean sensible (wet bulb) | 21.3 |
| Monthly range | 51.0 |
| Highest mean daily | 36.4, 9th |
| Lowest mean daily | 5.4, 12th |
| Mean maximum | 31.7 |
| Mean minimum | 15.3 |
| Mean daily range | 16.4 |
| Greatest daily range | 32.5, 27th |
| Least daily range | 3.0, 5th |

**Humidity.**

| | |
|---|---|
| Mean dew point | 17.6 |
| Mean force of vapor | .133 |
| Mean relative humidity | 82.4 |

**Precipitation.** In inches.

| | |
|---|---|
| Total precipitation, in inches | 3.64 |
| Total snow, in inches | 15 |
| Number of days on which .01 inch or more rain fell | 9 |
| **Days of Sleighing** | 25 |

**Wind.**

| | |
|---|---|
| Total movement | 4701 m |
| Greatest daily movement | 391m, 19th |
| Least daily movement | 7m, 14th |
| Mean daily movement | 152 m |
| Mean hourly velocity | 6.3 m |

Maximum pressure per square foot, 16.0 lbs = 57m per hour, 14th, 9 A, S.S.W.

Maximum velocity for 5 minutes 36m per hour, 14th, 9A, S.S.W.

Prevailing direction, West.

Summary.

| | |
|---|---|
| North Northwest | 10 per cent |
| West | 10 " " |
| West Southwest | 10 " " |
| Northwest | 19 " " |
| West Northwest | 16 " " |
| Southwest | 13 " " |
| Other directions | 22 " " |

**Weather.**

Mean cloudiness observed . . . . 64 per cent

Total cloudiness recorded by the Sun Thermometer . . 163 hours = 55 per cent

| | |
|---|---|
| Number of clear days | 9 |
| Number of fair days | 6 |
| Number of cloudy days | 16 |

**Bright Sunshine.**

Number hours recorded, 131 hrs, = 45 per cent

**Rain,** 5th, 14th, 31st.

**Snow,** 3d, 13th, 18th, 21st, 22d, 25th, 26th, 27th. 28th, 29th, 31st.

**Hail,** 13th.

**Gales,** 35 or more miles per hour. 36m, 6th, N.N.W.; 45m, 7th, N.W.; 35m, 11th, N.; 35m, 12th, N.N.W.; 57m, 14th, S.S.W.; 35m, 17th, W.N.W.; 41m, 19th, N.W.; 46m, 22d, N.W.; 37m, 25th, N.W.

---

*Temperature in ground shelter.

† Reduced to freezing and sea-level.

# DAILY SUMMARY.

| Day. | Barometer Reduced to Sea Level. | | | Temperature. Ground Shelter. | | | | | | | No. Hours of Bright Sunshine. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Maximum | Minimum. | Mean. Semi-daily. | Maximum | Time. | Minimum. | Time. | Mean of Max. and Min. | Mean Hourly Draper. | Mean Sensible Wet Bulb. | |
| 1 | 30.17 | 29 72 | 29.865 | 31.0 | 6 P | 16.0 | 5 A | 23.5 | 24.0 | 23.3 | 1.2 |
| 2 | 30.04 | 29.74 | 29.927 | 38.5 | 6:30 A | 29 0 | 0 A | 33.7 | 34.7 | 34.3 | 0 6 |
| 3 | 30.03 | 29 72 | 29.867 | 33.0 | 2 A | 24.0 | 6:30 A | 28.5 | 24.1 | 27.0 | 0.0 |
| 4 | 30.14 | 29.81 | 30.061 | 38.0 | 4 P | 27.5 | 8:30 A | 32.7 | 31.4 | 29.7 | 3.9 |
| 5 | 30.14 | 29.45 | 29 788 | 35.0 | 8:30 P | 32.0 | 0 A | 33.5 | 33.5 | 33.5 | 0.0 |
| 6 | 30.10 | 29.45 | 29.910 | 34.0 | 3 P | 22.0 | 11 P | 28.0 | 31.2 | 28.0 | 8 2 |
| 7 | 30.09 | 29 78 | 29.871 | 43.5 | 3 P | 23.0 | 1 A | 33.3 | 32.2 | 29.7 | 7.0 |
| 8 | 29.99 | 29.74 | 29.880 | 37.0 | 3: 0 P | 22.5 | 7 A | 29.7 | 30.7 | 27.7 | 8.2 |
| 9 | 29.74 | 29.39 | 29.495 | 41.0 | 4 P | 32.0 | 1 A | 36.5 | 36.4 | 34.7 | 3.5 |
| 10 | 29.51 | 29.36 | 29.435 | 42.0 | 6:30 P | 27.0 | 12 P | 34 5 | 35.1 | 33.7 | 1.4 |
| 11 | 29.83 | 29.47 | 29 671 | 27.0 | 0 A | 3.0 | 12 P | 15.0 | 13.5 | 9.3 | 4.1 |
| 12 | 30.60 | 29.83 | 30.379 | 14.5 | 3 P | −1.5 | 7 A | 6.5 | 5.4 | 3.3 | 8.5 |
| 13 | 30.66 | 30 43 | 30.584 | 22.0 | 2 P | 4.5 | 4:30 A | 13 3 | 13.5 | 14.0 | 0 0 |
| 14 | 30.51 | 29 87 | 30.181 | 47.5 | 8:30 A | 17.0 | 10 P | 32.3 | 28.3 | 32.0 | 2.3 |
| 15 | 30.74 | 30.51 | 30.681 | 23.5 | 12 M | 14.0 | 12 P | 18.7 | 18.9 | 18.3 | 2.3 |
| 16 | 30.61 | 30.27 | 30.444 | 26 5 | 3 P | 13.0 | 1:30 A | 19 7 | 18.9 | 16.5 | 8 2 |
| 17 | 30.27 | 29 89 | 30.009 | 33.0 | 3 P | 12 5 | 7:30 A | 22.7 | 22.3 | 17.3 | 8.4 |
| 18 | 29.89 | 29 50 | 29 585 | 32.5 | 3:30 P | 19.5 | 3 A | 26.0 | 26 5 | 25.0 | 3 0 |
| 19 | 30.19 | 29 55 | 29 976 | 25.0 | 0 A | 7.0 | 10 P | 16.0 | 15.8 | 12.0 | 8.7 |
| 20 | 30.20 | 29 99 | 30.102 | 25.5 | 4 P | 9.0 | 3 A | 17.3 | 15.8 | 14.7 | 2.1 |
| 21 | 30.18 | 29 74 | 30 048 | 24.5 | 1 P | 13.0 | 0 A | 18.7 | 18.1 | 17 3 | 1.2 |
| 22 | 30.01 | 29 38 | 29.656 | 41 0 | 1:30 P | 16.5 | 3 A | 28 7 | 23.1 | 18.7 | 3 6 |
| 23 | 30.37 | 30.01 | 30.291 | 26 0 | 1:30 P | 4.0 | 6:30 A | 15.0 | 16.0 | 11 0 | 9.0 |
| 24 | 30.26 | 29.96 | 30.103 | 29.5 | 3:30 P | 0.0 | 7:30 A | 14.7 | 14.3 | 11.5 | 6.2 |
| 25 | 29.96 | 29.76 | 29.818 | 33.0 | 3 P | 14 0 | 6:30 A | 23.5 | 22.6 | 20.7 | 4.3 |
| 26 | 30.26 | 29 81 | 30 024 | 21.0 | 3:30 P | 4.0 | 7:30 A | 12.5 | 13.5 | 9 3 | 4.3 |
| 27 | 30.54 | 30 26 | 30.444 | 29.0 | 4:30 P | −3 5 | 6 A | 12 7 | 13.6 | 11.7 | 8 5 |
| 28 | 30.34 | 30.20 | 30.250 | 24.5 | 3:30 P | 18.0 | 0:30 A | 21.3 | 21.1 | 20.5 | 0.2 |
| 29 | 30.26 | 29.78 | 30.123 | 26.0 | 3:30 P | 13.0 | 6 A | 19.5 | 19.7 | 19.0 | 0.0 |
| 30 | 29.96 | 29.65 | 29.786 | 42.0 | 1:30 P | 17.0 | 0:30 A | 28 3 | 31.6 | 29.7 | 8.7 |
| 31 | 30.08 | 29.79 | 29 972 | 36.5 | 3 P | 25.0 | 5:30 A | 30.7 | 31.5 | 28.3 | 3.3 |

# DAILY SUMMARY.

| Day. | Humidity. | | | Wind. | | | | | Precipitation. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Mean Dew Point. | Mean Force vapor. | Mean Relative Humidity. | Prevailing Direction. | Total Movement in Miles. | Maximum Pressure Per Square Ft | Miles per Hour. | Time. | Beginning. | Ending. | Total in Inches. Rain.** | Total in Inches. Snow. |
| 1 | 20.5 | .135 | 87.5 | S.W. | 163 | 2.0 | 20 | 2 P | | | | |
| 2 | 32.5 | .207 | 88.0 | W.N.W. | 88 | 0.5 | 10 | 6 A | | | | |
| 3 | 24.0 | .154 | 86.5 | E.N.E. | 48 | 3.0 | 24 | 12 M | 11 A | 10 P | .55 | 5½ |
| 4 | 27.5 | .172 | 90.0 | N.N.E. | 7 | 0.0 | — | — | | | | |
| 5 | 31.5 | .197 | 95.0 | E. | 71 | 0.5 | 10 | 8 A | 10 A | 11 P | 1.21 | |
| 6 | 24.5 | .167 | 80.5 | N.N.W. | 259 | 6.5 | 36 | 12 M | | | | |
| 7 | 27.5 | .180 | 86.5 | W.N.W. | 176 | 10.0 | 45 | 10 P | | | | |
| 8 | 24.0 | .165 | 81.0 | W.S.W. | 298 | 4.0 | 28 | 2 P | | | | |
| 9 | 34.0 | .212 | 93.0 | S.W. | 262 | 4.5 | 30 | 5 A | | | | |
| 10 | 30.5 | .208 | 86.0 | W.S.W. | 155 | 5.0 | 32 | 4 P | | | | |
| 11 | 4.5 | .073 | 76.0 | N.N.W. | 346 | 6.0 | 35 | 1 P | | | | |
| 12 | −0.5 | .055 | 80.5 | N.W. | 254 | 6.0 | 35 | 12 M | | | | |
| 13 | 11.5 | .088 | 89.5 | W. | 22 | 0.0 | — | — | 9 A | 12 P | .10 | 1¼ |
| 14 | 29.0 | .211 | 87.5 | W. | 235 | 16.0 | 57 | 9 A | 0 A | 11 A | .72 | |
| 15 | 14.5 | .108 | 82.0 | N.N.W. | 199 | 0.5 | 10 | 11 A | | | | |
| 16 | 10.0 | .104 | 73.5 | N.W. | 126 | 1.5 | 17 | 5 P | | | | |
| 17 | 9.5 | .109 | 68.0 | W.N.W. | 283 | 6.0 | 35 | 5 P | | | | |
| 18 | 13.0 | .147 | 76.5 | W.N.W. | 293 | 5.0 | 32 | 11 P | 7 A | | T | T |
| 19 | 5.5 | .085 | 73.5 | N.W. | 391 | 8.5 | 41 | 0 A | | | | |
| 20 | 10.5 | .092 | 83.0 | W. | 62 | 0.0 | — | — | | | | |
| 21 | 15.5 | .101 | 88.0 | S.S.E. | 32 | 0.0 | — | — | 4 P | 12 P | * | * |
| 22 | 12.5 | .112 | 75.5 | W.N.W. | 183 | 10.5 | 46 | 3 P | 0 A | 4 A | .56 | 3½ |
| 23 | 5.0 | .080 | 71.5 | W.S.W. | 192 | 1.0 | 14 | 8 P | | | | |
| 24 | 9.0 | .090 | 87.5 | S.S.W. | 40 | 0.0 | — | — | | | | |
| 25 | 17.5 | .127 | 81.0 | S.W. | 40 | 7.0 | 37 | 9 P | 8 P | 10 P | .04 | ½ |
| 26 | 8.5 | .078 | 90.0 | N.W. | 104 | 2.5 | 22 | 9 P | 12 M | 3 P | T | T |
| 27 | 6.5 | .086 | 73.5 | S.W. | 80 | 1.0 | 14 | 7 P | 8 P | 12 P | * | * |
| 28 | 18.5 | .115 | 89.0 | S. | 58 | 0.0 | — | — | 0 A | 10 A | .10 | 1 |
| 29 | 17.0 | .109 | 88.5 | S. | 16 | 0.5 | 10 | 8 A | 8 A | 10:30P | .34 | 3 |
| 30 | 26.5 | .177 | 82.0 | N.W. | 148 | 4.0 | 28 | 10 A | | | | |
| 31 | 25.5 | .165 | 84.0 | N.W. | 130 | 0.5 | 10 | 5 A | 7 P | 12 P | .02 | ¼ |

**Rain or melted snow at base of tower.

*Included in following day.

## REMARKS

The weather during the month was generally seasonable, and abnormal features were wanting. While the last half of the month was somewhat colder than the first half there was but little zero weather. On the other hand, there were only five days when the mean hourly temperature was above the freezing point and these were all during the first third of the month. More than one-half the total precipitation was in the form of rain. While the snowfall was moderate, sleighing was possible during most of the month.

The records of the several weather elements show the following as the more important features: The mean barometer was comparatively low for this season of the year and the range about one-fifth of an inch less than usual. The fluctuations of pressure, however, were larger than usual. The maximum and minimum pressures for the month were both above the normals for these features at this station.

The maximum temperature was nearly four degrees lower than usual and the minimum more than three degrees higher than usual, giving a small range for the month. The mean hourly temperature was 1.6 degrees lower than the normal. The temperature was below zero on but two days of the month.

The mean dewpoint was practically normal, while the relative humidity was more than five points higher than the normal. The total precipitation was slightly more than usual and was well distributed throughout the month.

The total wind movement was less than normal, although there were more gales than usual. Most of the gales were from the northwest quadrant.

The amount of sunshine was comparatively small, more than half of the days being either cloudy or overcast.

J. E. OSTRANDER, Meteorologist.

W. P. SAUNDERS, Acting Observer.

MAY 1 1
Agricult
College

BULLETIN No. 338. FEBRUARY, 1917

# Meteorological Observations
AT THE
# MASSACHUSETTS
# AGRICULTURAL EXPERIMENT
# STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.
*Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.*
*Height of Wind Instruments 72 ft.*

## MONTHLY SUMMARY.

### Pressure. In inches.

| | |
|---|---|
| Maximum reduced to freezing | 30.09, 13th, 8 A |
| Minimum reduced to freezing | 28.61, 5th, 11 A |
| Reduced† maximum reading | 30.43, 13th, 8 A |
| Reduced† minimum reading | 28.93, 5th, 11 A |
| Mean semi-daily reduced | 29.930 |
| Monthly range | 1.50 |

### *Air Temperature. In Degrees Fahr.

| | |
|---|---|
| Highest | 46.0, 27th, 2:30 P |
| Lowest | -16.0, 13th, 7 A |
| Mean hourly | 20.6 |
| Mean of means of max. and min. | 19.9 |
| Mean sensible (wet bulb) | 17.4 |
| Monthly range | 62.0 |
| Highest mean daily | 38.5, 27th |
| Lowest mean daily | 0.8, 12th |
| Mean maximum | 29.6 |
| Mean minimum | 10.3 |
| Mean daily range | 19.3 |
| Greatest daily range | 38.0, 13th |
| Least daily range | 10.0, 10th |

### Humidity.

| | |
|---|---|
| Mean dew point | 14.2 |
| Mean force of vapor | .117 |
| Mean relative humidity | 82.7 |

### Precipitation. In inches.

| | |
|---|---|
| Total precipitation, in inches | 1.98 |
| Total snow, in inches | 11 |
| Number of days on which .01 inch or more rain fell | 9 |
| **Days of Sleighing** | 28 |

### Wind.

| | |
|---|---|
| Total movement | 4485 m |
| Greatest daily movement | 488m, 10th |
| Least daily movement | 21m, 15th |
| Mean daily movement | 174 m |
| Mean hourly velocity | 7.3 m |

Maximum pressure per square foot, 15.0 lbs = 55m per hour, 5th, 10 A, S.W.

Maximum velocity for 5 minutes 30m per hour, 5th, 2P, S.W.

Prevailing direction, West.

### Summary.

| | |
|---|---|
| South Southwest | 11 per cent |
| West | 18 " " |
| West Northwest | 11 " " |
| Northwest | 18 " " |
| Other directions | 42 " |

### Weather.

| | |
|---|---|
| Mean cloudiness observed | 45 per cent |
| Total cloudiness recorded by the Sun Thermometer | 116 hours = 39 per cent |
| Number of clear days | 10 |
| Number of fair days | 13 |
| Number of cloudy days | 5 |

### Bright Sunshine.

Number hours recorded, 180 hrs, = 61 per cent

**Rain,** 1st, 9th, 23d, 24th, 26th.

**Snow,** 1st, 4th, 5th, 9th, 19th, 20th.

**Gales,** 35 or more miles per hour. 43m, 2d, N.N.W.; 49m, 3d, S.S.E.; 55m, 5th, S.W.; 36m, 6th, S.; 38m, 9th, S.W.; 52m, 10th, N.W.; 36m, 17th, S..; 39m, 23d, S.S.W.; 42m, 24th, W.; 35m. 26th, S.

*Temperature in ground shelter.

† Reduced to freezing and sea-level.

# DAILY SUMMARY.

| Day. | Barometer Reduced to Sea Level. | | | Temperature. Ground Shelter. | | | | | | | No. Hours of Bright Sunshine. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Maximum | Minimum. | Mean. Semi-daily. | Maximum | Time. | Minimum. | Time. | Mean of Max. and Min. | Mean Hourly Draper. | Mean Sensible Wet Bulb. | |
| 1 | 29.79 | 29.43 | 29.590 | 32.0 | 1:30 P | 16.0 | 12 P | 24.0 | 28.1 | 26.3 | 0.0 |
| 2 | 29.74 | 29.66 | 29.693 | 16.0 | 0 A | 2.0 | 12 P | 9.0 | 7.3 | 3.7 | 9.0 |
| 3 | 29.80 | 29.69 | 29.738 | 10.0 | 8 P | −2.0 | 5:30 A | 4.0 | 4.3 | 4.0 | 7.3 |
| 4 | 29.69 | 29 32 | 29.550 | 28.0 | 4 P | 7.0 | 2 A | 17.5 | 18.1 | 17.2 | 6 8 |
| 5 | 29.64 | 28.93 | 29.269 | 29.0 | 8:30 A | 12.0 | 12 P | 20.5 | 18.9 | 17.7 | 0.0 |
| 6 | 30.08 | 29.64 | 29 921 | 28.0 | 2:30 P | 12.0 | 0 A | 20.0 | 17.9 | 15.5 | 9.3 |
| 7 | 30.10 | 29 81 | 30.000 | 31 0 | 8:30 P | 12.0 | 3:30 A | 21.5 | 22.0 | 21.7 | 4.7 |
| 8 | 29.81 | 29 68 | 29.738 | 42.5 | 2:30 P | 25.0 | 3 A | 33.7 | 33.1 | 30.8 | 6.5 |
| 9 | 29.68 | 29.13 | 29.365 | 29.0 | 5:30 A | 12.0 | 12 P | 20.5 | 26.1 | 21.8 | 0.0 |
| 10 | 30 04 | 29.37 | 29.893 | 12.0 | 0 A | 2.0 | 12 P | 7.0 | 6.9 | 4.4 | 9.5 |
| 11 | 30.30 | 30.04 | 30.229 | 16.0 | 3:30 P | −8.0 | 6:30 A | 4.0 | 5.1 | 1.2 | 9.2 |
| 12 | 30.40 | 30.30 | 30.390 | 8.0 | 2:30 P | −10.0 | 7:30 A | −1.0 | 0.8 | −3.3 | 9.0 |
| 13 | 30.43 | 30.08 | 30.312 | 22.0 | 4 P | −16.0 | 7 A | 3.0 | 5.0 | 0.6 | 9.0 |
| 14 | 30.13 | 29.92 | 29 970 | 28.0 | 4 P | 7.0 | 7:30 A | 17.5 | 17.5 | 10.7 | 8.7 |
| 15 | 29.97 | 29.53 | 29.807 | 32.0 | 5:30 P | −2.0 | 7 A | 15.0 | 14.9 | 10 0 | 8.3 |
| 16 | 29.62 | 29.37 | 29 584 | 32.0 | 4 P | 7.0 | 8:30 A | 19.5 | 21.1 | 17.1 | 7.0 |
| 17 | 29.86 | 29.62 | 29.822 | 36.0 | 3:30 P | 16.0 | 7:30 A | 26.0 | 27.1 | 23.8 | 7.0 |
| 18 | 30.20 | 29.76 | 30.040 | 42.0 | 11 A | 23.0 | 12 P | 32.5 | 34.3 | 29.1 | 9.7 |
| 19 | 30.37 | 30.12 | 30.313 | 30.0 | 4 P | 13.0 | 8 A | 21.5 | 21.7 | 19.5 | 7.8 |
| 20 | 30.12 | 29 76 | 29.885 | 40.0 | 4 P | 26.0 | 0 A | 33.0 | 30.2 | 28.0 | 6.5 |
| 21 | 30 24 | 29.89 | 30.153 | 30.0 | 4 P | 13.0 | 7:30 A | 21.5 | 22.8 | 19.3 | 10.0 |
| 22 | 30.35 | 30.03 | 30.268 | 25.0 | 3:30 P | 7.0 | 5 A | 16.0 | 13.4 | 11.7 | 5.5 |
| 23 | 30.35 | 29.78 | 30 181 | 38.0 | 3:30 P | 5.0 | 7:30 A | 21.5 | 25.2 | 20.3 | 6.8 |
| 24 | 30.10 | 29 66 | 29.853 | 42.0 | 3 P | 23.0 | 12 P | 32.5 | 33.7 | 19.3 | 7.0 |
| 25 | 30.42 | 30.10 | 30.348 | 28.0 | 3:30 P | 11.0 | 7 A | 19.5 | 19 0 | 16.2 | 7.8 |
| 26 | 30.28 | 29 60 | 29.844 | 43.0 | 7:30 P | 23.0 | 0 A | 33.0 | 35 6 | 36.0 | 0.0 |
| 27 | 30.16 | 29.60 | 29 947 | 46 0 | 2:30 P | 30 0 | 12 P | 38.0 | 38.5 | 35.0 | 6.4 |
| 28 | 30.37 | 30.16 | 30.333 | 33.0 | 4:30 P | 21.0 | 12 P | 27.0 | 27.8 | 28.3 | 1.3 |

# DAILY SUMMARY.

| Day. | Humidity. | | | Wind. | | | | | Precipitation. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Total in Inches. | |
| | Mean Dew Point. | Mean Force vapor. | Mean Relative Humidity. | Prevailing Direction. | Total Movement in Miles. | Maximum Pressure Per Square Ft | Miles per Hour. | Time. | Beginning. | Ending. | Rain.** | Snow. |
| 1 | 23.5 | .153 | 85.0 | N.W. | 121 | 5.5 | 33 | 6 P | 0 A | 9:30 A | .24 | 2½ |
| 2 | −0.5 | .056 | 80.0 | N.N.W | 176 | 9.0 | 43 | 9 P | | | | |
| 3 | −0.5 | .058 | 76.0 | S.E. | 178 | 12.0 | 49 | 2 P | | | | |
| 4 | 13.0 | .108 | 78.5 | E.S.E. | 257 | 3.5 | 26 | 2 P | 9:30 P | 12 P | * | * |
| 5 | 13.0 | .108 | 78.0 | S.S.W. | 276 | 15.0 | 55 | 10 A | 0 A | 2 P | .34 | 6 |
| 6 | 12.0 | .094 | 84.0 | S.S.W. | 200 | 6.5 | 36 | 6 A | | | | |
| 7 | 20.5 | .125 | 91.0 | E.S.E. | 128 | 3.0 | 24 | 8 P | | | | |
| 8 | 28.0 | .186 | 84.0 | E.N.E. | 120 | 1.0 | 14 | 12 M | | | | |
| 9 | 20.0 | .128 | 91.0 | W.N.W. | 107 | 7.0 | 38 | 11 P | 8 A | 12 P | .28 | 1½ |
| 10 | −0.5 | .058 | 76.5 | N.W. | 488 | 13.5 | 52 | 11 A | | | | |
| 11 | −3.0 | .050 | 80.5 | W.N.W. | 118 | 3.5 | 26 | 3 P | | | | |
| 12 | −7.0 | .040 | 80.0 | N.N.W. | 141 | 2.5 | 22 | 1 P | | | | |
| 13 | −4.0 | .058 | 75.5 | N.W. | 42 | 0.5 | 10 | 4 P | | | | |
| 14 | 8.5 | .076 | 87.0 | W S.W. | 52 | 1.0 | 14 | 3 P | | | | |
| 15 | 5.5 | .084 | 78.0 | N. | 21 | 0.5 | 10 | 12 P | | | | |
| 16 | 13.5 | .107 | 85.0 | N.W. | 97 | 1.5 | 17 | 10 P | | | | |
| 17 | 20.0 | .139 | 84.5 | S. | 201 | 6.5 | 36 | 4 P | | | | |
| 18 | 27.5 | .179 | 86.5 | W. | 196 | 4.0 | 28 | 12 M | | | | |
| 19 | 15.0 | .113 | 81.5 | N.W. | 105 | 2.5 | 22 | 7 A | 8:30 P | 12 P | * | * |
| 20 | 25.5 | .161 | 87.0 | W S.W. | 66 | 4.0 | 28 | 9 P | 0 A | 2 A | .15 | 1 |
| 21 | 15.0 | .113 | 79.0 | W.N.W | 222 | 3.0 | 24 | 3 A | | | | |
| 22 | 9.0 | .078 | 88.5 | W. | 40 | 0.5 | 10 | 2 P | | | | |
| 23 | 19.0 | .135 | 91.0 | S.S.W. | 201 | 7.5 | 39 | 3 P | 7 P | 12 P | * | |
| 24 | 26.0 | .175 | 83.0 | W. | 175 | 9.0 | 42 | 7 P | 0 A | 7 A | .35 | |
| 25 | 11.5 | .100 | 75.5 | S.W. | 196 | 3.0 | 34 | 0 A | | | | |
| 26 | 34.0 | .223 | 88.5 | S. | 342 | 6.0 | 35 | 9 A | 8 A | 11 P | .62 | |
| 27 | 33.0 | .212 | 90.5 | W. | 105 | 2.5 | 22 | 6 P | | | | |
| 28 | 19.0 | .154 | 69.0 | W. | 114 | 1.0 | 14 | 0 A | | | | |

**Rain or melted snow at base of tower. *Included in following day.

## REMARKS

During the month of February unusually cold weather was much in evidence; the first half of the month, especially having a number of days showing temperatures below zero. The precipitation was comparatively light, but the absence of any warm days allowed the sleighing to continue in fair condition up to the close of the month. While the amount of sunshine was rather large, it did not appear to have any effect on the general temperature.

The records of the several weather elements show a number of features of interest when compared with the normals for this station.

The mean barometer was about one-tenth of an inch below the normal, while the range was practically normal. The fluctuations in pressute were generally large, and extended over considerable periods. Both the maximum and minimum pressures were more than two-tenths lower than usual. The number of gales was large, and two showed pressures indicating velocities in excess of 50 miles per hour ; several of the gales were from the south compass points.

The mean temperature was three and one-half degrees below the normal, and minimum was about eight degrees lower than the average minimum for February. On the 12th the average of the hourly temperatures was nearly zero. The maximum temperature was about five degrees lower than usual for this feature, and occurred near the end of the month.

The mean dew point was quite low, while the relative humidity was considerably above the normal.

The total precipitation was not more than one-half the normal, and was about equally distributed between rain and snow. No storms of marked severity were noted.

The number of hours of sunshine was large, and only five cloudy and overcast days were noted.

J. E. OSTRANDER, Meteorologist.

W. P. SAUNDERS, Acting Observer.

**BULLETIN No. 339.** **MARCH, 1917**

# Meteorological Observations
AT THE
# MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.
*Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.*
*Height of Wind Instruments 72 ft.*

## MONTHLY SUMMARY.

### Pressure. In inches.

| | |
|---|---|
| Maximum reduced to freezing | 30.20, 7th, 9 A |
| Minimum reduced to freezing | 29.14, 29th, 1 P |
| Reduced† maximum reading | 30.53, 7th, 9 A |
| Reduced† minimum reading | 29.44, 29th, 1 P |
| Mean semi-daily reduced | 30.063 |
| Monthly range | 1.09 |

### *Air Temperature. In Degrees Fahr.

| | |
|---|---|
| Highest | 58.0, 25th, 4:30 P<br>26th, 4 P. |
| Lowest | —2.0, 7th, 7 A |
| Mean hourly | 33.3 |
| Mean of means of max. and min. | 33.4 |
| Mean sensible (wet bulb) | 29.7 |
| Monthly range | 60.0 |
| Highest mean daily | 44.2, 27th |
| Lowest mean daily | 19.8, 19th |
| Mean maximum | 41.9 |
| Mean minimum | 24.9 |
| Mean daily range | 17.0 |
| Greatest daily range | 43.0, 7th |
| Least daily range | 6.0, 11th |

### Humidity.

| | |
|---|---|
| Mean dew point | 25.0 |
| Mean force of vapor | .186 |
| Mean relative humidity | 77.8 |

### Precipitation. In inches.

| | |
|---|---|
| Total precipitation, in inches | 3.66 |
| Total snow, in inches | 17 |
| Number of days on which .01 inch or more rain fell | 13 |
| **Days of Sleighing** | 11 |

### Wind.

| | |
|---|---|
| Total movement | 5804 m |
| Greatest daily movement | 462m, 19th |
| Least daily movement | 14m, 3d |
| Mean daily movement | 187 m |
| Mean hourly velocity | 7.8 m |

Maximum pressure per square foot, 10.5 lbs = 46m per hour, 6th, 0 A, N.

Maximum velocity for 5 minutes 33m per hour, 6th, 1 A, W.N.W.

Prevailing direction, West.

Summary.

| | |
|---|---|
| West Southwest | 13 per cent |
| West | 13 " " |
| West Northwest | 19 " " |
| Northwest | 13 " " |
| Southwest | 10 " " |
| Other directions | 32 " " |

### Weather.

| | |
|---|---|
| Mean cloudiness observed | 50 per cent |
| Total cloudiness recorded by the Sun Thermometer | 139 hours = 37 per cent |
| Number of clear days | 13 |
| Number of fair days | 10 |
| Number of cloudy days | 8 |

### Bright Sunshine.

Number hours recorded, 232 hrs, = 63 per cent

**Rain**, 4th, 8th, 11th, 12th. 17th, 20th, 24th 27th, 28th, 29th.

**Snow**, 3d, 4th, 5th, 11th, 14th, 15th, 17th, 18th.

**Hail**, 5th.

**Gales**, 35 or more miles per hour. 46m, 6th, N.; 39m, 12th, W.N.W.; 35m, 15th, N.W.; 35m, 18th, W.; 42m, 19th, W.N.W.; 36m, 20th, S.; 43m, 23d, W.S.W..; 35m, 24th, N.W.; 35m, 27th, S.W.; 36m, 28th, N.W.

*Temperature in ground shelter.

† Reduced to freezing and sea-level.

# DAILY SUMMARY.

| Day. | Barometer Reduced to Sea Level. | | | Temperature. Ground Shelter. | | | | | | | No. Hours of Bright Sunshine. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Maximum | Minimum. | Mean. Semi-daily. | Maximum | Time. | Minimum. | Time. | Mean of Max. and Min. | Mean Hourly Draper. | Mean Sensible Wet Bulb. | |
| 1 | 30.35 | 30.27 | 30.321 | 36.0 | 3:30 P | 18.0 | 3:30 A | 27.0 | 27.0 | 24.7 | 6.7 |
| 2 | 30.48 | 30.35 | 30.448 | 34.0 | 3:30 P | 23.0 | 6 A | 28.5 | 28.3 | 24.3 | 6.0 |
| 3 | 30.33 | 30.21 | 30.282 | 34.0 | 3 P | 28.0 | 4:30 A | 31.0 | 30.8 | 29.5 | 3.3 |
| 4 | 30.21 | 30.10 | 30.173 | 36.0 | 3:30 P | 29.0 | 12 P | 32.5 | 31.4 | 29.5 | 3.8 |
| 5 | 30.10 | 29.53 | 29.776 | 30.0 | 4 A | 17.0 | 10 P | 23.5 | 23.4 | 19.7 | 2.2 |
| 6 | 30.41 | 29.69 | 30.259 | 31.0 | 4:30 P | 15.0 | 6:30 A | 23.0 | 20.7 | 17.0 | 10.8 |
| 7 | 30.53 | 30.24 | 30.458 | 41.0 | 4 P | −2.0 | 7 A | 19.5 | 20.8 | 16.6 | 9.5 |
| 8 | 30.24 | 29.68 | 29.839 | 39.0 | 5:30 P | 28.0 | 1:30 A | 33.5 | 32.5 | 32.5 | 0.0 |
| 9 | 30.01 | 29.68 | 29.854 | 41.0 | 2:30 P | 31.0 | 0 A | 36.0 | 35.3 | 31.3 | 5.0 |
| 10 | 30.18 | 30.01 | 30.170 | 42.5 | 3:30 P | 26.5 | 6:30 A | 34.5 | 33.0 | 29.5 | 10.3 |
| 11 | 30.14 | 29.61 | 29.829 | 35.0 | 3 P | 29.0 | 4 A | 32.0 | 32.0 | 30.0 | 0.3 |
| 12 | 30.07 | 29.58 | 29.874 | 39.5 | 2:30 P | 27.0 | 12 P | 33.3 | 33.7 | 30.0 | 9.0 |
| 13 | 30.24 | 30.07 | 30.170 | 42.5 | 4 P | 21.0 | 6:30 A | 31.7 | 31.6 | 27.5 | 10.6 |
| 14 | 30.27 | 30.06 | 30.203 | 34.0 | 2 P | 23.5 | 6 A | 28.7 | 29.3 | 27.5 | 1.3 |
| 15 | 30.06 | 29.86 | 29.952 | 39.0 | 4 P | 29.0 | 12 P | 34.0 | 33.8 | 30.3 | 7.7 |
| 16 | 30.25 | 29.98 | 30.231 | 48.5 | 5 P | 26.0 | 1:30 A | 37.3 | 36.1 | 30.0 | 11.1 |
| 17 | 30.29 | 29.54 | 29.835 | 38.0 | 5 P | 26.0 | 5 A | 32.0 | 33.2 | 32.5 | 0.0 |
| 18 | 29.69 | 29.53 | 29.590 | 38.0 | 2 P | 25.0 | 12 P | 31.5 | 32.9 | 27.7 | 7.0 |
| 19 | 30.12 | 29.69 | 30.012 | 24.5 | 3:30 P | 15.0 | 12 P | 19.7 | 19.8 | 14.7 | 11.2 |
| 20 | 30.14 | 29.82 | 29.983 | 40.0 | 4:30 P | 14.0 | 1 A | 27.0 | 28.8 | 25.3 | 8.4 |
| 21 | 29.99 | 29.87 | 29.954 | 46.0 | 3 P | 30.0 | 5:30 A | 38.0 | 38.2 | 34.0 | 9.0 |
| 22 | 30.33 | 29.92 | 30.248 | 49.0 | 4:30 P | 29.5 | 6 A | 39.3 | 36.7 | 32.7 | 11.0 |
| 23 | 30.34 | 29.85 | 30.192 | 49.0 | 1 P | 23.0 | 4:30 A | 36.0 | 37.0 | 33.0 | 7.5 |
| 24 | 30.06 | 29.66 | 29.878 | 50.0 | 4:30 P | 27.0 | 9 A | 38.5 | 43.3 | 40.7 | 8.3 |
| 25 | 30.30 | 30.06 | 30.200 | 58.0 | 4:30 P | 26.0 | 7 A | 42.0 | 41.2 | 35.5 | 12.4 |
| 26 | 30.41 | 30.24 | 30.365 | 58.0 | 4 P | 26.0 | 7:30 A | 42.0 | 42.9 | 34.0 | 12.4 |
| 27 | 30.24 | 29.50 | 29.805 | 56.0 | 11 A | 32.0 | 5 A | 44.0 | 44.2 | 43.0 | 0.0 |
| 28 | 29.80 | 29.54 | 29.749 | 44.0 | 2 P | 34.0 | 5 A | 39.0 | 37.6 | 34.5 | 12.5 |
| 29 | 29.70 | 29.44 | 29.529 | 49.0 | 12 M | 32.0 | 12 P | 40.5 | 39.4 | 36.5 | 11.6 |
| 30 | 29.96 | 29.61 | 29.869 | 45.0 | 3 P | 32.0 | 0 A | 38.5 | 37.2 | 30.3 | 12.0 |
| 31 | 30.02 | 29.83 | 29.929 | 51.5 | 4:30 P | 31.0 | 3:30 A | 41.3 | 40.5 | 35.3 | 11.2 |

# DAILY SUMMARY.

| Day. | Humidity. | | | Wind. | | | | | Precipitation. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Mean Dew Point. | Mean Force vapor. | Mean Relative Humidity. | Prevailing Direction. | Total Movement in Miles. | Maximum Pressure Per Square Ft | Miles per Hour. | Time. | Beginning. | Ending. | Total in Inches. | |
| | | | | | | | | | | | Rain.** | Snow. |
| 1 | 19.5 | .149 | 76.0 | W.S.W | 35 | 1.0 | 14 | 6 P | | | | |
| 2 | 17.0 | .150 | 66.5 | W. | 34 | 0.5 | 10 | 9 P | | | | |
| 3 | 27.5 | .168 | 95.0 | W. | 14 | 0.0 | — | — | 5 A | 12 P | * | * |
| 4 | 27.5 | .167 | 95.0 | N.N.W | 62 | 2.0 | 20 | 2 P | 0 A | 12 P | * | * |
| 5 | 17.5 | .112 | 87.0 | N.N.E. | 252 | 5.0 | 32 | 12 M | 0 A | 7 P | 1.05 | 11 |
| 6 | 9.0 | .105 | 69.0 | W.N.W. | 288 | 10.5 | 46 | 0 A | | | | |
| 7 | 12.5 | .113 | 82.5 | W.S.W. | 55 | 1.5 | 17 | 5 P | | | | |
| 8 | 30.5 | .189 | 92.5 | S. | 38 | 0.0 | — | — | 5 A | 11:30A | .42 | |
| 9 | 24.5 | .204 | 66.0 | W.S.W. | 256 | 3.5 | 27 | 12 M | | | | |
| 10 | 27.0 | .170 | 89.5 | W.N.W. | 172 | 2.0 | 20 | 1 P | | | | |
| 11 | 26.5 | .178 | 83.0 | S. | 36 | 0.5 | 10 | 12 M | 4 A | 10:30A | .28 | 2 |
| 12 | 27.5 | .176 | 85.0 | N.W. | 247 | 7.5 | 39 | 5 P | 0 A | 1 A | .04 | |
| 13 | 19.5 | .178 | 64.0 | N.N.W. | 227 | 3.5 | 27 | 9 A | | | | |
| 14 | 22.5 | .163 | 75.0 | W. | 105 | 2.5 | 23 | 2 A | 1 P | 7:30P | .24 | 2½ |
| 15 | 25.0 | .184 | 74.5 | N.E. | 172 | 6.0 | 35 | 6 P | 6:30A | 8 A | .05 | ½ |
| 16 | 24.0 | .190 | 69.0 | W.N.W. | 128 | 1.5 | 17 | 3 P | | | | |
| 17 | 29.5 | .195 | 86.5 | S.S.E. | 134 | 4.5 | 30 | 12 M | 11 A | 10 P | .67 | 1 |
| 18 | 22.0 | .169 | 75.5 | W. | 326 | 6.0 | 35 | 6 P | 10 A | | | T |
| 19 | 6.0 | .098 | 62.0 | W.N.W. | 462 | 9.0 | 42 | 10 A | | | | |
| 20 | 17.5 | .160 | 69.0 | S.W. | 130 | 6.5 | 36 | 12 M | 2 P | | T | |
| 21 | 28.5 | .221 | 69.5 | W.N.W. | 140 | 1.5 | 17 | 1 A | | | | |
| 22 | 29.0 | .203 | 79.0 | N. | 173 | 3.0 | 24 | 2 P | | | | |
| 23 | 31.0 | .206 | 87.0 | E.S.E. | 224 | 9.0 | 43 | 2 P | | | | |
| 24 | 39.0 | .267 | 90.0 | N.W. | 370 | 6.0 | 35 | 8 A | 5 A | 10 A | .10 | |
| 25 | 32.5 | .233 | 84.0 | S.S.W. | 98 | 4.0 | 28 | 12 M | | | | |
| 26 | 31.0 | .216 | 81.5 | S.W. | 190 | 4.5 | 30 | 12 M | | | | |
| 27 | 40.5 | .296 | 86.0 | W.S.W. | 189 | 6.0 | 35 | 8 P | 3:30 P | 12 P | * | |
| 28 | 31.5 | .214 | 82.5 | N.W. | 325 | 6.5 | 36 | 12 M | 0 A | 5 A | 1.20 | |
| 29 | 31.0 | .246 | 72.5 | W.N,W. | 310 | 3.5 | 26 | 6 A | 7 A | 3 P | .03 | |
| 30 | 19.0 | .210 | 50.0 | N.W. | 280 | 5.0 | 32 | 11 A | | | | |
| 31 | 29.0 | .240 | 66.5 | S.W. | 52 | 0.0 | — | — | | | | |

**Rain or melted snow at base of tower.

*Included in following day.

## REMARKS

During the the month of March the transition from winter to spring weather was practically completed. Early in the month one of the heaviest snowstorms of the winter occurred and zero temperature was registered, while by the last week of the month nearly all of the snow had disappeared and mild, sunny days were prevalent. The melting of the snow was gradual so that the streams were less swollen than is often the case. At the close of the month the season's advance was slightly ahead of normal conditions, and much of the frost was out of the ground.

The records of the several weather elements show the following interesting features: The mean barometer was considerably higher than the normal and the range less that usual. While the wind movement was rather large it was due to many moderate gales rather than extremely high velocities.

The maximum temperature was about four degrees lower than the normal while the minimum was more than six degrees lower than usual, giving a rather large range. The mean temperature was less than a degree below the normal.

The mean dew point was rather low and the relative humidity about three points above the normal for this station.

The total precipitation was about ninety per cent. of the normal. The most severe storms were a heavy snowfall of more than two days duration, shortly after the opening of the month and a heavy rainstorm, mostly during the night of the 27th.

The amount of sunshine was considerably more than the normal and about three-fourths of the days were either clear or fair.

J. E. OSTRANDER, Meteorologist.

W. P. SAUNDERS, Observer.

BULLETIN No. 340. APRIL, 1917

# Meteorological Observations
AT THE
# MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.
*Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.*
*Height of Wind Instruments 72 ft.*

## MONTHLY SUMMARY.

### **Pressure.** In inches.

| | |
|---|---|
| Maximum reduced to freezing | 30.03, 17th, 8 A |
| Minimum reduced to freezing | 28.93, 6th, 5 P |
| Reduced† maximum reading | 30.33, 17th, 8 A |
| Reduced† minimum reading | 29.24, 6th, 5 P |
| Mean semi-daily reduced | 29.925 |
| Monthly range | 1.09 |

### ***Air Temperature.** In Degrees Fahr.

| | |
|---|---|
| Highest | 71.0, 19th, 4 P |
| Lowest | 25.0, 15th, 6 A |
| Mean hourly | 42.9 |
| Mean of means of max. and min. | 42.1 |
| Mean sensible (wet bulb) | 39.1 |
| Monthly range | 46.0 |
| Highest mean daily | 58.3, 22d |
| Lowest mean daily | 31.0, 9th |
| Mean maximum | 53.0 |
| Mean minimum | 34.2 |
| Mean daily range | 18.8 |
| Greatest daily range | 35.0, 25th |
| Least daily range | 7.0, 30th |

### **Humidity.**

| | |
|---|---|
| Mean dew point | 34.3 |
| Mean force of vapor | .279 |
| Mean relative humidity | 74.6 |

### **Precipitation.** In inches.

| | |
|---|---|
| Total precipitation, in inches | 1.83 |
| Total snow, in inches | Trace |
| Number of days on which .01 inch or more rain fell | 10 |

### **Wind.**

| | |
|---|---|
| Total movement | 3853 m |
| Greatest daily movement | 611m, 11th |
| Least daily movement | 14m, 1st |
| Mean daily movement | 128 m |
| Mean hourly velocity | 5.3 m |

Maximum pressure per square foot, 35.0 lbs = 84m per hour, 10th, 3 P, N.W.
Maximum velocity for 5 minutes 40m per hour, 10th, 3 P, N.W.
Prevailing direction, West Northwest.

Summary.

| | |
|---|---|
| Northwest | 33 per cent |
| West Northwest | 17 " " |
| South | 13 " " |
| Other directions | 37 " " |

### **Weather.**

| | |
|---|---|
| Mean cloudiness observed | 46 per cent |
| Total cloudiness recorded by the Sun Thermometer | 108 hours = 27 per cent |
| Number of clear days | 16 |
| Number of fair days | 10 |
| Number of cloudy days | 4 |

### **Bright Sunshine.**

Number hours recorded, 294 hrs, = 73 per cent

**Rain,** 1st, 6th, 7th, 12th, 18th, 20th, 21st, 26th, 27th, 29th, 30th.

**Snow,** 12th, 27th.

**Thunder and Lightning,** 21st.

**Gales,** 35 or more miles per hour. 40m, 4th, N.W.; 36m, 7th, N.W.; 39m, 9th, N.N.W.; 84m, 10th, N.W.

---

*Temperature in ground shelter.

† Reduced to freezing and sea-level.

# DAILY SUMMARY.

| Day. | Barometer Reduced to Sea Level. | | | Temperature. Ground Shelter. | | | | | | | No. Hours of Bright Sunshine. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Maximum | Minimum. | Mean. Semi-daily. | Maximum | Time. | Minimum. | Time. | Mean of Max. and Min. | Mean Hourly Draper. | Mean Sensible Wet Bulb. | |
| 1 | 29.97 | 29.81 | 29.900 | 66 0 | 2:30 P | 37.0 | 5:30 A | 51.5 | 49.5 | 44.5 | 9.2 |
| 2 | 30.01 | 29.91 | 29.974 | 47.0 | 4 P | 37.0 | 12 P | 42.0 | 40.9 | 37 0 | 7.3 |
| 3 | 30.21 | 29.94 | 30.126 | 51 0 | 3:30 P | 35.0 | 5:30 A | 43.0 | 41.5 | 36.7 | 9.7 |
| 4 | 30.28 | 30.23 | 30.281 | 54.0 | 5 P | 32.5 | 3 A | 43.3 | 42.0 | 36.3 | 12.4 |
| 5 | 30.22 | 29.73 | 30.020 | 53.0 | 3 P | 27.0 | 5 A | 40.0 | 40.8 | 37.7 | 10.0 |
| 6 | 29.73 | 29.24 | 29.347 | 42.0 | 2 P | 33.0 | 3:30 A | 37.5 | 38.7 | 37 0 | 0.0 |
| 7 | 29.80 | 29 26 | 29 544 | 45.5 | 11:30 A | 35.5 | 4 A | 40.5 | 39.2 | 35.5 | 7.0 |
| 8 | 29.91 | 29.79 | 29.890 | 46.0 | 3 P | 30.0 | 6 A | 38.0 | 37.3 | 29.0 | 11.8 |
| 9 | 29.79 | 29.62 | 29 664 | 46.0 | 3 P | 30.0 | 6 A | 38.0 | 31.0 | 27.7 | 7.2 |
| 10 | 29.72 | 29.56 | 29.686 | 40.0 | 3 P | 28.0 | 11 P | 34.0 | 32.1 | 27.7 | 12.3 |
| 11 | 29.85 | 29.56 | 29.736 | 59.0 | 3 P | 30 0 | 6 A | 44.5 | 42.1 | 34.7 | 12.7 |
| 12 | 29.85 | 29 65 | 29.733 | 44.0 | 4:30 P | 33.0 | 6 A | 38.5 | 37.7 | 35.0 | 5.0 |
| 13 | 29.68 | 29 59 | 29.664 | 44.0 | 4:30 P | 32.0 | 12 P | 38.0 | 39.0 | 33 5 | 12.0 |
| 14 | 29.77 | 29.65 | 29.738 | 50 0 | 3 P | 27.0 | 5 A | 38.5 | 38.4 | 34.5 | 7.5 |
| 15 | 29.90 | 29 77 | 29.834 | 47.0 | 3:30 P | 25.0 | 6 A | 36.0 | 36.5 | 31.3 | 12.3 |
| 16 | 30.19 | 29.90 | 30.117 | 44.5 | 4 P | 34.0 | 1 A | 39.3 | 39.1 | 36.0 | 12.4 |
| 17 | 30.33 | 30.19 | 30.305 | 62.0 | 5 P | 35.0 | 6 A | 48.5 | 47.0 | 42.7 | 12.8 |
| 18 | 30.28 | 30.10 | 30.180 | 55.0 | 5 P | 32.0 | 5:30 A | 43.5 | 44.0 | 41.0 | 11.5 |
| 19 | 30.12 | 30.00 | 30.065 | 71.0 | 4 P | 43.0 | 5 A | 57.0 | 54.0 | 48.5 | 8.8 |
| 20 | 30.16 | 30 08 | 30.122 | 50.0 | 2 P | 42.5 | 6 P | 46.3 | 46.6 | 44.3 | 4 0 |
| 21 | 30.03 | 29 70 | 29.858 | 62.0 | 5:30 P | 43.0 | 3 A | 52.5 | 51.5 | 50.7 | 13.5 |
| 22 | 29.94 | 29 84 | 29 896 | 70 0 | 3 P | 42 0 | 5:30 A | 56.0 | 58.3 | 58 7 | 13.5 |
| 23 | 29.98 | 29-82 | 29.925 | 66.0 | 8:30 A | 43.0 | 2 A | 54.5 | 52.8 | 51.7 | 12.1 |
| 24 | 30.06 | 29 86 | 29 951 | 60.0 | 4:30 P | 35.0 | 1:30 A | 47.5 | 46 4 | 41.3 | 13.6 |
| 25 | 30.14 | 30.03 | 30.114 | 62.0 | 5 P | 27.0 | 5:30 A | 44.5 | 43.7 | 37.7 | 12.7 |
| 26 | 30.14 | 30.04 | 30.092 | 45.5 | 2 P | 35 5 | 2:30 A | 40.5 | 39.5 | 36.5 | 4.2 |
| 27 | 30.08 | 29.99 | 30.012 | 43 0 | 3:30 P | 35.0 | 7 A | 39.0 | 39 0 | 37.7 | 5.9 |
| 28 | 30.01 | 29 85 | 29.940 | 58.0 | 3 P | 34.0 | 5:30 A | 46.0 | 46.0 | 40.5 | 12.7 |
| 29 | 30.00 | 29.94 | 30.010 | 58.0 | 12 M | 31.0 | 4:30 A | 44.5 | 47.8 | 46 3 | 12.8 |
| 30 | 30.04 | 29.97 | 30.011 | 48.0 | 1 P | 41.0 | 7 A | 44.5 | 44 0 | 40.0 | 8.1 |

# DAILY SUMMARY.

| Day. | Humidity. | | | Wind. | | | | | Precipitation. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Total in Inches. | |
| | Mean Dew Point. | Mean Force vapor. | Mean Relative Humidity. | Prevailing Direction. | Total Movement in Miles. | Maximum Pressure Per Square Ft | Miles per Hour. | Time. | Beginning. | Ending. | Rain.** | Snow. |
| 1 | 42.5 | .322 | 85.5 | S.W. | 14 | 0.5 | 10 | 7 P | 3 A | 6 A | .23 | |
| 2 | 35.0 | .234 | 85.5 | E. | 38 | 3.0 | 24 | 11 A | | | | |
| 3 | 30.0 | .256 | 67.0 | N.W. | 64 | 4.0 | 28 | 7 P | | | | |
| 4 | 29 5 | .242 | 69 5 | N.W. | 163 | 8.0 | 40 | 6 P | | | | |
| 5 | 34.0 | .253 | 78.5 | N.W. | 230 | 3.0 | 24 | 10 P | | | | |
| 6 | 35.5 | .229 | 89.5 | N.N.E. | 118 | 3.5 | 26 | 6 A | 0 A | 12 P | * | |
| 7 | 31.5 | .230 | 76.5 | N.W. | 153 | 6.5 | 36 | 2 P | 0 A | 8 A | .87 | |
| 8 | 19.5 | .196 | 54.0 | N.W. | 196 | 3.5 | 26 | 2 P | | | | |
| 9 | 26.0 | .158 | 89.0 | N.N W. | 300 | 7.5 | 39 | 4 P | | | | |
| 10 | 16.0 | .182 | 59.5 | N.W. | 306 | 35.0 | 84 | 3 P | | | | |
| 11 | 24.0 | .256 | 56.5 | W.N.W. | 611 | 3.0 | 24 | 2 P | | | | |
| 12 | 30.5 | .230 | 74.5 | W.N.W. | 309 | 0.5 | 10 | 3 P | 6 A | 1 P | T | T |
| 13 | 27 5 | .224 | 66.0 | S.W. | 17 | 2.0 | 20 | 3 P | | | | |
| 14 | 28.5 | .232 | 66.5 | W.N.W. | 67 | 2.0 | 20 | 1 P | | | | |
| 15 | 24.5 | .207 | 64 5 | W. | 71 | 2.5 | 22 | 2 P | | | | |
| 16 | 31.5 | .236 | 76.5 | W. | 87 | 3.0 | 24 | 2 P | | | | |
| 17 | 35.5 | .346 | 61.0 | W.N.W. | 125 | 1.0 | 14 | 11 A | | | | |
| 18 | 37.0 | .298 | 74.5 | W.N,W. | 16 | 0.5 | 10 | 12 M | 11 A | 1 P | .01 | |
| 19 | 45 5 | .392 | 77.0 | N.W. | 59 | 1.5 | 17 | 3 P | | | | |
| 20 | 42.5 | .263 | 89.0 | E.S.E. | 121 | 3.0 | 24 | 2 P | 2 A | 12 P | * | |
| 21 | 50 0 | .388 | 95.0 | S.S.E. | 45 | 1.0 | 14 | 6 P | 0 A | 11 P | .48 | |
| 22 | 57.0 | .513 | 95.5 | N.W. | 83 | 4.0 | 28 | 12 M | | | | |
| 23 | 50.0 | .434 | 85.5 | N.W. | 81 | 3 0 | 24 | 1 P | | | | |
| 24 | 33.5 | .324 | 59.0 | N. | 140 | 5.0 | 32 | 5 A | | | | |
| 25 | 31.5 | .316 | 56.0 | N.W. | 84 | 4.5 | 30 | 8 P | | | | |
| 26 | 32.5 | .238 | 77.0 | S.W. | 75 | 3.5 | 26 | 3 P | 5 A | 12 P | * | |
| 27 | 36 0 | .236 | 90.0 | S.W. | 17 | 0.0 | — | — | 0 A | 6 P | .20 | T |
| 28 | 34.0 | .305 | 64.5 | N.N.E. | 170 | 2.0 | 20 | 9 A | | | | |
| 29 | 41.5 | .370 | 71.0 | E. | 46 | 1.0 | 14 | 4 P | 1 P | 12 P | * | |
| 30 | 37 0 | .268 | 82.5 | S. | 47 | 1.0 | 14 | 2 P | 0 A | 6 P | .04 | |

**Rain or meltedsnow at base of tower. *Included in following day.

## REMARKS

The weather during April was a disappointment from the standpoint of seasonal progress. At the beginning of the month conditions were somewhat in advance of the normal, but so little progress was made during the month owing to abnormally cool weather that the month closed with the season's progress more than a week backward. The last five days of the month averaged nearly the same temperature as the first five days. The precipitation was comparatively small and without any storms of much severity.

The records of the several weather elements compared with the normals, show the following more important features of the month. The mean barometer was considerably below the normal and the maximum and minimum pressures were both comparatively low records. The range of pressure was practically normal. The total wind movement was about three-fourths of the usual amount notwithstanding the unusually large daily movements from the 9th to the 12th inclusive. Tne record of the 11th was exceptionally large for this station.

The mean temperature was about three and one-half degrees below the normal, making it one of the coldest Aprils on our records. The maximum temperature was more than eight degrees lower than usual, while the minimum was rather high, making a very small range for the month.

The mean dew point was slightly below the normal, while the relative humidity was several points above the normal.

The total precipitation was about sixty per cent of the normal and a trace of snow was noted near the end of the month. The sunshine record was comparatively high.

J. E. OSTRANDER, Meteorologist.

W. P. SAUNDERS, Observer.

ERRATUM : Total precipitation on first page of bulletin No. 339, for March, should read 4.08.

BULLETIN No. 341. MAY, 1917

# Meteorological Observations
AT THE
# MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.
*Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.*
*Height of Wind Instruments 72 ft.*

## MONTHLY SUMMARY.

**Pressure.** In inches.

| | |
|---|---|
| Maximum reduced to freezing | 29.97, 31st, 8 A |
| Minimum reduced to freezing | 29.17, 11th, 1 P |
| Reduced† maximum reading | 30.27, 31st, 8 A |
| Reduced† minimum reading | 29.47, 11th, 1 P |
| Mean semi-daily reduced | 29.809 |
| Monthly range | 0.80 |

***Air Temperature.** In Degrees Fahr.

| | |
|---|---|
| Highest | 81.0, 19th, 4:30 P |
| Lowest | 28.5, 4th, 6 A |
| Mean hourly | 49.3 |
| Mean of means of max. and min. | 49.5 |
| Mean sensible (wet bulb) | 44.4 |
| Monthly range | 52.5 |
| Highest mean daily | 62.7, 19th |
| Lowest mean daily | 38.6, 5th |
| Mean maximum | 59.3 |
| Mean minimum | 39.7 |
| Mean daily range | 19.6 |
| Greatest daily range | 37.0, 18th |
| Least daily range | 5.5, 27th |

**Humidity.**

| | |
|---|---|
| Mean dew point | 39.2 |
| Mean force of vapor | .357 |
| Mean relative humidity | 70.4 |

**Precipitation.** In inches.

| | |
|---|---|
| Total precipitation, in inches | 4.13 |
| Number of days on which .01 inch or more rain fell | 13 |

*Temperature in ground shelter.

**Reduced to freezing and sea-level.

**Wind.**

| | |
|---|---|
| Total movement | 4610 m |
| Greatest daily movement | 312m, 6th |
| Least daily movement | 16m, 27th |
| Mean daily movement | 147 m |
| Mean hourly velocity | 6.1 m |

Maximum pressure per square foot, 9.5 lbs = 44m per hour, 15th, 7 A, N.N.W.

Maximum velocity for 5 minutes 27m per hour, 12th, 2 P, N.N.W.

Prevailing direction, Northwest.

Summary.

| | |
|---|---|
| North Northwest | 32 per cent |
| West Northwest | 16 " " |
| West | 13 " " |
| Other directions | 39 " " |

**Weather.**

Mean cloudiness observed . . . . 50 per cent

Total cloudiness recorded by the Sun Thermometer . . 136 hours = 30 per cent

| | |
|---|---|
| Number of clear days | 14 |
| Number of fair days | 10 |
| Number of cloudy days | 7 |

**Bright Sunshine.**

Number hours recorded, 317 hrs, = 70 per cent

**Rain,** 1st, 2d, 4th, 5th, 6th, 9th, 10th, 12th, 13th, 22d, 23d, 24th, 27th, 28th, 29th.

**Snow,** 5th.

**Thunder and Lightning,** 28th.

**Hail,** 5th, 12th.

**Frosts,** 4th, 16th, 18th.

**Gales,** 35 or more miles per hour. 41m, 10th, W.N.W.; 36m, 12th, N.N.W.; 35m, 13th, N.N.W.; 38m, 14th, N.N.W.; 44m. 15th, N.N.W.; 37m, 19th, S.W.; 41m, 25th, N.W.; 35m, 26th. W.N.W.

# DAILY SUMMARY.

| | Barometer Reduced to Sea Level. | | | Temperature. Ground Shelter. | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Day. | Maximum | Minimum. | Mean. Semi-daily. | Maximum | Time. | Minimum. | Time. | Mean of Max. and Min. | Mean Hourly Draper. | Mean Sensible Wet Bulb. | No. Hours of Bright Sunshine. |
| 1 | 30.00 | 29.78 | 29.904 | 44.0 | 1 A | 37.0 | 12 P | 40.5 | 39.5 | 37.0 | 0.0 |
| 2 | 29.82 | 29.70 | 29.764 | 51.5 | 2:30 P | 35.0 | 6 A | 43.3 | 41.7 | 38.0 | 8.9 |
| 3 | 29.98 | 29.81 | 29.910 | 46.0 | 4 P | 37.0 | 12 P | 41.5 | 41.3 | 36.7 | 6.8 |
| 4 | 30.01 | 29.90 | 29 975 | 62.0 | 4 P | 28.5 | 6 A | 45.3 | 46.3 | 40.7 | 12.5 |
| 5 | 29.94 | 29.85 | 29.892 | 42.0 | 3 P | 36.0 | 6:30 A | 39.0 | 38.6 | 36.7 | 3.2 |
| 6 | 30.11 | 29.91 | 30.054 | 50.0 | 3 P | 36.0 | 6 A | 43.0 | 41.7 | 38.0 | 7.0 |
| 7 | 30.14 | 30.07 | 30.101 | 56.5 | 2:30 P | 37.5 | 5:30 A | 47.0 | 46.5 | 40.0 | 8.5 |
| 8 | 30.06 | 29.76 | 29.917 | 53.0 | 12 M | 40.5 | 5:30 A | 46.7 | 46.4 | 42.7 | 8.2 |
| 9 | 29.76 | 29.57 | 29.642 | 59 0 | 12 M | 40.0 | 3:30 A | 49.5 | 47.8 | 43.7 | 10 0 |
| 10 | 29.58 | 29.50 | 29.540 | 55.0 | 2:30 P | 38.0 | 3 A | 46.5 | 47.2 | 42.5 | 11.5 |
| 11 | 29.53 | 29.47 | 29.523 | 51.0 | 10:30 A | 40.0 | 10 P | 45.5 | 44 9 | 39.3 | 1.7 |
| 12 | 29.63 | 29.53 | 29.588 | 57.0 | 1 P | 38.0 | 4:30 A | 47.5 | 45.1 | 41.7 | 11.2 |
| 13 | 29.69 | 29.63 | 29.674 | 58.0 | 2 P | 39.5 | 1 A | 48.7 | 48.4 | 46.0 | 11.7 |
| 14 | 29.65 | 29.48 | 29.568 | 72.0 | 3 P | 46.0 | 4 A | 59.0 | 58.1 | 50.5 | 13.0 |
| 15 | 29.78 | 29 54 | 29.729 | 59 0 | 3:30 P | 37.0 | 11 P | 48.0 | 46.5 | 37.3 | 13.5 |
| 16 | 29 75 | 29.54 | 29.642 | 59.0 | 12:30 P | 30 0 | 5 A | 44.5 | 44.6 | 36.3 | 12.1 |
| 17 | 29.85 | 29.55 | 29.744 | 67.0 | 4:30 P | 41.0 | 1:30 A | 54.0 | 53.8 | 46 7 | 13.6 |
| 18 | 29 97 | 29.72 | 29.844 | 72.0 | 2:30 P | 35.0 | 5 A | 53.5 | 55.2 | 49.7 | 12.0 |
| 19 | 29.92 | 29.70 | 29.847 | 81.0 | 4:30 P | 45.0 | 5:30 A | 63.0 | 62.7 | 54.7 | 13.2 |
| 20 | 29.78 | 29.59 | 29 675 | 80.0 | 2 P | 50.0 | 5:30 A | 65.0 | 62.5 | 53.5 | 12.1 |
| 21 | 29.96 | 29.78 | 29.926 | 69 0 | 5 P | 43.0 | 5:30 A | 56.0 | 57.3 | 49 0 | 13.1 |
| 22 | 29 97 | 29.82 | 29.928 | 55.0 | 0 A | 46.0 | 7 A | 50.5 | 49.0 | 46.3 | 2.3 |
| 23 | 29.82 | 29.63 | 30.680 | 50.0 | 5 P | 43.0 | 5:30 A | 46.5 | 46.4 | 45.3 | 1.3 |
| 24 | 29.70 | 29.57 | 29.629 | 58.0 | 4 P | 39 0 | 5:30 A | 48.5 | 49.6 | 45.7 | 10.8 |
| 25 | 29.76 | 29.62 | 29.682 | 57.0 | 4 P | 39 0 | 5 A | 48.0 | 48.7 | 43.5 | 13.3 |
| 26 | 29.85 | 29.76 | 29.842 | 69 0 | 4 P | 42.0 | 5 A | 55.5 | 57.4 | 53.0 | 13.6 |
| 27 | 29.82 | 29.71 | 29.794 | 54.5 | 8:30 A | 49.0 | 5:30 A | 51.7 | 52.8 | 51.5 | 0.4 |
| 28 | 29.96 | 29.79 | 29.914 | 54.0 | 12 M | 41.0 | 12 P | 47.5 | 48.7 | 44.5 | 6.1 |
| 29 | 29.89 | 29.70 | 29.784 | 50.0 | 4 P | 41.0 | 0 A | 45.5 | 46.1 | 43.5 | 3.1 |
| 30 | 30.19 | 29.80 | 30.162 | 72.0 | 4 P | 40 0 | 2:30 A | 56.0 | 54.0 | 50.3 | 13.0 |
| 31 | 30.27 | 30.15 | 30.218 | 76.0 | 1:30 P | 40.0 | 5 A | 58.0 | 59.1 | 51.7 | 13.6 |

# DAILY SUMMARY.

| Day. | Humidity. | | | Wind. | | | | | Precipitation. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Total in Inches. | |
| | Mean Dew Point. | Mean Force vapor. | Mean Relative Humidity. | Prevailing Direction. | Total Movement in Miles. | Maximum Pressure Per Square Ft | Miles per Hour. | Time. | Beginning. | Ending. | Rain.** | Snow. |
| 1 | 35.0 | .238 | 84.0 | S.S.E. | 43 | 1.5 | 17 | 10 P | 6:30 A | 12 P | * | |
| 2 | 33.5 | .261 | 75.0 | W.N.W. | 187 | 3.0 | 24 | 11 A | 0 A | 5 A | .42 | |
| 3 | 30.5 | .253 | 68.0 | W.N.W. | 237 | 2.5 | 22 | 8 A | | | | |
| 4 | 35.0 | .314 | 65.0 | W.N.W. | 25 | 1.0 | 14 | 7 P | 11 P | 12 P | T | |
| 5 | 34.5 | .230 | 87.5 | N.E. | 148 | 3.0 | 24 | 3 P | 0 A | 12 P | * | T |
| 6 | 34.5 | .252 | 80.0 | N.N.E. | 312 | 2.5 | 22 | 9 A | 0 A | 5 A | .90 | |
| 7 | 34.5 | .298 | 68.0 | N.N.W. | 25 | 1.0 | 14 | 2 P | | | | |
| 8 | 39.5 | .302 | 80.0 | S. | 55 | 1.0 | 14 | 12 M | | | | |
| 9 | 39.5 | .238 | 69 5 | N.N.W. | 92 | 3.0 | 24 | 1 P | 12 M | 8 P | .02 | |
| 10 | 34.5 | .344 | 57.0 | W.N,W. | 257 | 8.5 | 41 | 2 P | 10 A | 4 P | .03 | |
| 11 | 33.0 | .284 | 66.5 | W.N.W. | 270 | 4.5 | 30 | 12 M | | | | |
| 12 | 38.0 | .297 | 78.5 | N.N.W. | 184 | 6.5 | 36 | 1 P | 10 A | 12 P | .10 | |
| 13 | 42.0 | .350 | 75.5 | N. | 216 | 6.0 | 35 | 3 P | 0 A | 8 A | .01 | |
| 14 | 42.0 | .506 | 52.5 | N.N.W. | 187 | 7.5 | 38 | 11 A | | | | |
| 15 | 25.0 | .278 | 53.0 | N.N.W. | 294 | 9.5 | 44 | 7 A | | | | |
| 16 | 30.5 | .292 | 58.5 | N.W. | 168 | 4.5 | 30 | 3 P | | | | |
| 17 | 40.0 | .420 | 58.5 | N.N.W. | 162 | 4.5 | 30 | 10 A | | | | |
| 18 | 41.5 | .426 | 61.5 | W.S.W. | 115 | 4.0 | 28 | 2 A | | | | |
| 19 | 46 5 | .588 | 55.0 | S.S.W. | 192 | 7.0 | 37 | 7 P | | | | |
| 20 | 48.5 | .512 | 67.5 | W. | 202 | 5.5 | 33 | 4 P | | | | |
| 21 | 42.5 | .442 | 62.5 | N.N.W. | 155 | 3.5 | 26 | 9 A | | | | |
| 22 | 44.0 | .341 | 84.5 | E.N.E. | 50 | 1.0 | 14 | 3 P | 2 A | 12 P | .65 | |
| 23 | 43.5 | .317 | 89.0 | E.N.E. | 70 | 0.5 | 10 | 6 P | 0 A | 3 P | .28 | |
| 24 | 39.0 | .382 | 63.0 | W. | 140 | 4.5 | 30 | 12 M | 7 P | | T | |
| 25 | 36.5 | .353 | 61.5 | N.W. | 242 | 8.5 | 41 | 3 P | | | | |
| 26 | 46.5 | .444 | 68.0 | W. | 209 | 6.0 | 35 | 12 M | | | | |
| 27 | 49.0 | .415 | 85.0 | W. | 16 | 0.0 | — | — | 8 A | 12 P | .59 | |
| 28 | 42.0 | .330 | 80.0 | N. | 73 | 1.0 | 14 | 6 P | 0 A | 12 P | .96 | |
| 29 | 41.5 | .312 | 82.5 | N.N.W. | 119 | 1.0 | 14 | 3 A | 0 A | 12 M | .17 | |
| 30 | 46.5 | .433 | 73.5 | N.N.W. | 69 | 2.0 | 20 | 6 P | | | | |
| 31 | 47 0 | .463 | 70.5 | N.N.W. | 96 | 3.5 | 26 | 7 P | | | | |

**Rain or meltedsnow at base of tower. *Included in following day.

# REMARKS

The one predominating feature of the weather during May was the abnormal temperature which prevailed throughout the month. The mean hourly temperature was more than eight degrees below the normal at this station and two and one-half degrees below the record of 1907 which was the coldest May up to that time since this station was established. Using the maximum and minimum records of Professor Snell of Amherst College, which go back to 1837, we find no records which indicate a colder May than 1907, up to this year. It is therefore evident that the month was the coldest May for at least eighty years. There were only four days in the month when the mean hourly temperature was higher than normal May weather.

As a result of the unseasonable temperature, seasonal progress was almost at a standstill during the month, and at its close vegetation was more than three weeks backward. The persisteney of the wind from the northwest quadrant during much of the month undoubtedly had much to do with the low temperature.

A comparison of the records of the several weather elements with the normals shows the following features : The mean barometer was the lowest since this station was established and the range was slightly smaller than usual. The barometer chart showed a comparatively steady pressure. The maximum temperature was six degrees lower than the normal but was higher than the 1915 record and almost the same as the 1916 record. While the maximum temperature was a few degrees lower than usual, it was not as low as in 1907, 1911, and 1914 of recent years.

The mean dew point was about as much below the normal as the mean temperature and made a new low record here. The relative humidity was nearly normal.

The total precipitation was four-tenths of an inch more than the normal. The total wind movement was practically normal. The cloudiness observed was about the usual amount.

J. E. OSTRANDER, Meteorologist.

W. P. SAUNDERS, Observer.

BULLETIN No. 342. JUNE, 1917

# Meteorological Observations
AT THE
# MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.
*Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.*
*Height of Wind Instruments 72 ft.*

## MONTHLY SUMMARY.

### **Pressure.** In inches.

Maximum reduced to freezing, 30.04, 13th, 7 A
Minimum reduced to freezing, 29.46, 29th, 8 P
Reduced† maximum reading, 30.33, 13ht, 7 A
Reduced† minimum reading, 29.75, 3rd, 3 P, 29th, 8P

| | |
|---|---|
| Mean semi-daily reduced | 29.995 |
| Monthly range | 58.0 |

### ***Air Temperature.** In Degrees Fahr.

| | |
|---|---|
| Highest | 88.0, 22d, 2 P |
| Lowest | 50.0, 18th, 2 A |
| Mean hourly | 65.3 |
| Mean of means of max. and min. | 66.3 |
| Mean sensible (wet bulb) | 60.1 |
| Monthly range | 38.0 |
| Highest mean daily | 72.6, 20th |
| Lowest mean daily | 55.4, 1st |
| Mean maximum | 76.3 |
| Mean minimum | 56.0 |
| Mean daily range | 20.3 |
| Greatest daily range | 33.0, 22d |
| Least daily range | 6.0, 11th |

### **Humidity.**

| | |
|---|---|
| Mean dew point | 57.4 |
| Mean force of vapor | .611 |
| Mean relative humidity | 78.3 |

### **Precipitation.** In inches.

| | |
|---|---|
| Total precipitation, in inches | 5.27 |
| Number of days on which .01 inch or more rain fell | 16 |

### **Wind.**

| | |
|---|---|
| Total movement | 2081 m |
| Greatest daily movement | 176m, 5th |
| Least daily movement | 5m, 11th |
| Mean daily movement | 69 m |
| Mean hourly velocity | 2.9 m |

Maximum pressure per square foot, 8.0 lbs = 40m per hour, 3rd, 6 P, N.W.
Maximum velocity for 5 minutes 27m per hour, 3rd, 6 P, .N.W.
Prevailing direction, Northwest.

### Summary.

| | |
|---|---|
| North Northwest | 20 per cent |
| South | 17 " " |
| Southwest | 17 " " |
| West Southwest | 10 " " |
| South Southwest | 10 " " |
| Other directions | 26 " " |

### **Weather.**

| | |
|---|---|
| Mean cloudiness observed | 49 per cent |
| Total cloudiness recorded by the Sun Thermometer | 207 hours = 45 per cent |
| Number of clear days | 6 |
| Number of fair days | 15 |
| Number of cloudy days | 9 |

### **Bright Sunshine.**

Number hours recorded, 250 hrs, = 55 per cent.

**Rain.** 3d, 5th, 6th, 7th, 8th, 10th, 11th, 12th, 14th, 15th, 16th, 17th, 22d, 24th, 25th, 26th, 27th, 29th.

**Thunder and Lightning.** 7th, 8th, 14th, 22d, 24th, 26th, 27th, 29th.

**Gales.** 35 or more miles per hour. 40m, 3d, N.W.

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*Temperature in ground shelter.
**Reduced to freezing and sea-level.

# DAILY SUMMARY.

| Day. | Barometer Reduced to Sea Level. | | | Temperature. Ground Shelter. | | | | | | | No. Hours of Bright Sunshine |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Maximum | Minimum. | Mean. Semi-daily. | Maximum | Time. | Minimum. | Time. | Mean of Max. and Min. | Mean Hourly Draper. | Mean Sensible Wet Bulb. | |
| 1 | 30.21 | 30.02 | 30.087 | 58.0 | 12 M | 51.0 | 3 A | 54.5 | 55.4 | 54 5 | 4.7 |
| 2 | 30.02 | 29.94 | 29 983 | 70.0 | 1 P | 56.0 | 0 A | 63.0 | 62.3 | 59 7 | 5.7 |
| 3 | 30.03 | 29.75 | 29.907 | 83.0 | 3:30 P | 59 0 | 6 A | 71.0 | 65.3 | 57.3 | 9.4 |
| 4 | 30.17 | 30.03 | 30.107 | 80.0 | 3:30 P | 56.0 | 5 A | 68.0 | 65.7 | 57.5 | 13.8 |
| 5 | 30.14 | 29.88 | 29.982 | 79.5 | 1:30 P | 50.5 | 5 A | 65.0 | 63.5 | 57.5 | 10.4 |
| 6 | 30.04 | 29.94 | 29.982 | 78.0 | 3:30 P | 56.0 | 1 A | 67.0 | 65.2 | 60 0 | 11.1 |
| 7 | 30.02 | 29.86 | 29.906 | 62.0 | 2 P | 54.0 | 4 A | 58 0 | 59.4 | 58.7 | 0.3 |
| 8 | 29.92 | 29.80 | 29.836 | 77.0 | 3 P | 55 0 | 5 A | 66.0 | 65.1 | 60.5 | 11.0 |
| 9 | 29.94 | 29.85 | 29.868 | 81 0 | 5 P | 59 0 | 3:30 A | 70.0 | 69.3 | 62.7 | 11.2 |
| 10 | 29.95 | 29.90 | 29.930 | 64.0 | 10:30 A | 55.0 | 12 P | 59.5 | 60.2 | 58.3 | 0.0 |
| 11 | 30.13 | 29 99 | 30.048 | 60.0 | 4 P | 54.0 | 3:30 A | 57.0 | 56.3 | 55.0 | 0.0 |
| 12 | 30.31 | 30.13 | 30.259 | 76.0 | 3:30 P | 53.0 | 6 A | 64.5 | 61.6 | 57.0 | 8.5 |
| 13 | 30.33 | 30.10 | 30 230 | 81.0 | 3:30 P | 59 0 | 4 A | 70.0 | 67.1 | 62.0 | 9.6 |
| 14 | 30.10 | 29.77 | 29 856 | 76 5 | 1:30 P | 59.0 | 5 A | 67.7 | 64.8 | 61.7 | 4.5 |
| 15 | 29.97 | 29 82 | 29.876 | 76.0 | 3 P | 57.5 | 6 A | 66.7 | 64.5 | 60.0 | 8.3 |
| 16 | 30.17 | 29.95 | 30.054 | 72.0 | 3:30 P | 58.0 | 12 P | 65.0 | 64.3 | 62.3 | 6.0 |
| 17 | 30.18 | 30.02 | 30.068 | 66.0 | 3 P | 54.0 | 11:30 P | 60.0 | 57.6 | 52.5 | 4.1 |
| 18 | 30.10 | 30.05 | 30.075 | 80.0 | 3 P | 50.0 | 2 A | 65.0 | 66.3 | 61 5 | 12.7 |
| 19 | 30 08 | 29.97 | 30.036 | 85.0 | 4 P | 56.0 | 5 A | 70.5 | 70.9 | 65.3 | 11.5 |
| 20 | 30.02 | 29.92 | 29.971 | 86.0 | 3 P | 62 5 | 4 A | 74.3 | 72.6 | 62.3 | 11.4 |
| 21 | 30.04 | 29.96 | 29.992 | 85.0 | 3 P | 60.0 | 4 A | 72.5 | 70 8 | 63.5 | 11.0 |
| 22 | 30 04 | 29.93 | 29.976 | 88.0 | 2 P | 55.0 | 4 A | 71.5 | 71.1 | 64 5 | 9.8 |
| 23 | 30.02 | 29 90 | 29.963 | 81.0 | 4 P | 59.0 | 4:30 A | 70.0 | 71.1 | 61.5 | 12.6 |
| 24 | 30.04 | 29.79 | 29.853 | 76.0 | 3:30 P | 56.0 | 5:30 A | 66.0 | 65.2 | 59.0 | 8.7 |
| 25 | 30.20 | 30.03 | 30.134 | 79.0 | 3:30 P | 53.0 | 4:30 A | 66.0 | 64.2 | 59.0 | 9.9 |
| 26 | 30.23 | 30.05 | 30.149 | 79 0 | 11 A | 50.5 | 5 A | 64.7 | 66.0 | 60.3 | 6.5 |
| 27 | 30.10 | 29.91 | 29.929 | 83.0 | 2:30 P | 62.0 | 3 A | 72.5 | 71.1 | 64 5 | 12.2 |
| 28 | 29.97 | 29.92 | 29 954 | 82.5 | 2:30 P | 56 0 | 4 A | 69.3 | 69.8 | 60.5 | 12.3 |
| 29 | 30 02 | 29.75 | 29 866 | 70.0 | 0:30 P | 59.5 | 2 A | 64.7 | 65.2 | 64.0 | 0.7 |
| 30 | 30.05 | 29.84 | 29.960 | 76.0 | 3 P | 56.0 | 5 A | 66.0 | 65.6 | 60.0 | 12.5 |

# DAILY SUMMARY.

| Day. | Humidity. | | | Wind. | | | | | Precipitation. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Total in Inches. | |
| | Mean Dew Point. | Mean Force vapor. | Mean Relative Humidity. | Prevailing Direction. | Total Movement in Miles. | Maximum Pressure Per Square Ft | Miles per Hour. | Time. | Beginning. | Ending. | Rain.** | Snow. |
| 1 | 52.5 | .461 | 85.5 | S. | 150 | 2.0 | 20 | 12 M | | | | |
| 2 | 59.0 | .552 | 89.5 | S.W. | 17 | 0.0 | — | — | | | | |
| 3 | 55.0 | .538 | 80.5 | W.N.W. | 145 | 8.0 | 40 | 6 P | 8 A | 10 A | .03 | |
| 4 | 53.0 | .625 | 63.5 | W.N.W. | 90 | 2.0 | 20 | 6 A | | | | |
| 5 | 54.5 | .555 | 76.5 | S.W. | 176 | 5.5 | 33 | 2 P | 6 P | 12 P | .24 | |
| 6 | 57.0 | .634 | 74.0 | W.N.W. | 71 | 4.0 | 28 | 10 P | 0 A | 6 A | .13 | |
| 7 | 58.0 | .516 | 93.0 | S. | 41 | 1.0 | 14 | 4 A | 1 A | 12 P | .60 | |
| 8 | 58.5 | .600 | 82.5 | S.W. | 116 | 5.0 | 32 | 4 P | 0 A | 4 P | .06 | |
| 9 | 59.5 | .689 | 74 0 | S.S.W. | 48 | 1.5 | 17 | 12 M | | | | |
| 10 | 57.5 | .518 | 80.5 | S.E. | 22 | 0.5 | 10 | 10 A | 7 A | 12 P | .29 | |
| 11 | 54.0 | .465 | 88.5 | N.E. | 5 | 0.0 | — | — | 0 A | 12 P | .60 | |
| 12 | 55.5 | .527 | 85.5 | N.E. | 6 | 0.0 | — | — | 0 A | 8 A | 1.10 | |
| 13 | 60.0 | .621 | 85.0 | S.E. | 57 | 3.0 | 24 | 6 P | | | | |
| 14 | 61.0 | .586 | 90.5 | S.S.W. | 91 | 2.0 | 20 | 2 P | 2 P | 7 P | .21 | |
| 15 | 58.5 | .578 | 84.5 | W.S.W. | 13 | 0.5 | 10 | 6 P | 2 A | 8 A | .05 | |
| 16 | 61.0 | .602 | 88.5 | S. | 21 | 1.5 | 17 | 4 P | 10 A | 12 P | .12 | |
| 17 | 51.0 | .458 | 80.0 | N. | 129 | 4.0 | 28 | 4 P | 0 A | 5 P | .41 | |
| 18 | 57.5 | .670 | 72.0 | W.S.W. | 98 | 3.0 | 24 | 12 M | | | | |
| 19 | 62 0 | .766 | 72.0 | S.S.W. | 44 | 1.5 | 17 | 1 P | | | | |
| 20 | 56.5 | .738 | 62 0 | S. | 137 | 4.5 | 30 | 3 P | | | | |
| 21 | 59.5 | .694 | 75.5 | S. | 92 | 2.5 | 22 | 7 P | | | | |
| 22 | 61.5 | .720 | 76.0 | S.W. | 32 | 1.0 | 14 | 3 P | 4 P | 5 P | T | |
| 23 | 55.5 | .763 | 58.0 | W.N.W. | 48 | 1.5 | 17 | 3 P | | | | |
| 24 | 57.0 | .574 | 86.5 | W.N.W. | 42 | 1.5 | 17 | 3 P | 1 A | 6 A | 40 | |
| 25 | 56.0 | .586 | 77.0 | N.N.W. | 18 | 1.0 | 14 | 4 P | 10 A | 11 A | T | |
| 26 | 56.5 | .651 | 69.5 | S.W. | 76 | 5.0 | 32 | 7 P | 10 P | 12 P | .17 | |
| 27 | 61.0 | .678 | 72.5 | W.S.W | 162 | 5.0 | 32 | 1 A | 0 A | 1 A | .18 | |
| 28 | 54.5 | .717 | 59.5 | W.N.W. | 12 | 0.0 | — | — | | | | |
| 29 | 63.0 | .642 | 89.5 | W. | 20 | 1.0 | 14 | 7 P | 7 A | 7 P | .68 | |
| 30 | 56 5 | .608 | 76.0 | W. | 102 | 2.0 | 20 | 6 P | | | | |

**Rain or melted snow at base of tower. *Included in following day.

## REMARKS

The weather during June was much nearer normal than that of the preceding month and furnished but few features of special interest. The backwardness of the season which was so pronounced at the beginning of the month was much less noticeable when the month closed, although some maturing crops were still more than two weeks behind their normal progress. The precipitation was much greater than usual and the range of temperature unusually small.

A comparison of the records of the several weather elements with the normals of our twenty-five year summary, shows the following features of more or less interest: The mean barometer was slightly higher than the normal and the range unusually small. Owing to the steady pressure of the atmosphere the wind movement was but little more than one-half the usual amount and but a single gale was recorded on the pressure chart.

The mean temperature was practically normal, and the range the smallest of any June on our records. The maximum temperature was about three degrees lower than normal and the minimum was more than ten degrees higher than usual, making it our highest June minimum.

The mean dew point was practically normal and the relative humidity a few points higher than usual.

The total precipitation was more than sixty per cent above the normal and was well distributed,—a measurable amount occurring on more than half the days of the month.

The amount of sunshine was slightly less than normal.

J. E. OSTRANDER, Meteorologist.

W. P. SAUNDERS, Observer.

BULLETIN No. 343. JULY, 1917

# Meteorological Observations

AT THE

# MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.
*Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.*
*Height of Wind Instruments 72 ft.*

## MONTHLY SUMMARY.

**Pressure.** In inches.

| | |
|---|---|
| Maximum reduced to freezing | 29.93, 25th, 8 A |
| Minimum reduced to freezing | 29.36, 12th, 4 A |
| Reduced† maximum reading | 30.22, 25th, 8 A |
| Reduced† minimum reading | 29.66, 12th, 4 A |
| Mean semi-daily reduced | 29.948 |
| Monthly range | 0.56 |

***Air Temperature.** In Degrees Fahr.

| | |
|---|---|
| Highest | 98.5, 31st, 5 P |
| Lowest | 51.5, 6th, 5 A |
| Mean hourly | 71.7 |
| Mean of means of max. and min. | 72.5 |
| Mean sensible (wet bulb) | 66.2 |
| Monthly range | 47.0 |
| Highest mean daily | 86.4, 31st |
| Lowest mean daily | 60.4, 11th |
| Mean maximum | 83.1 |
| Mean minimum | 61.9 |
| Mean daily range | 21.2 |
| Greatest daily range | 33.5, 6th |
| Least daily range | 9.0, 11th |

**Humidity.**

| | |
|---|---|
| Mean dew point | 63.9 |
| Mean force of vapor | .764 |
| Mean relative humidity | 79.4 |

**Precipitation.** In inches.

| | |
|---|---|
| Total precipitation, in inches | 3.36 |
| Number of days on which .01 inch or more rain fell | 8 |

**Wind.**

| | |
|---|---|
| Total movement | 2133 m |
| Greatest daily movement | 242m, 19th |
| Least daily movement | 5m, 17th |
| Mean daily movement | 68.8 m |
| Mean hourly velocity | 2.9 m |

Maximum pressure per square foot, 10.0 lbs = 44m per hour, 18th, 10 P, S.S.W.

Maximum velocity for 5 minutes 24m per hour, 19th, 2:30 P, S.S.W.

Prevailing direction, Southwest.

Summary.

| | |
|---|---|
| South Southwest | 26 per cent |
| Southwest | 23 " " |
| Other directions | 51 " " |

**Weather.**

| | |
|---|---|
| Mean cloudiness observed | 48 per cent |
| Total cloudiness recorded by the Sun Thermometer | 177 hours = 38 per cent |
| Number of clear days | 5 |
| Number of fair days | 22 |
| Number of cloudy days | 4 |

**Bright Sunshine.**

Number hours recorded, 285 hrs, = 62 per cent.

**Rain,** 2d, 9th, 11th, 12th, 13th, 14th, 15th, 17th, 18th, 19th, 21st, 24th, 29th.

**Thunder and Lightning,** 15th, 17th, 21st, 24th.

**Hail,** 21st.

**Gales,** 35 or more miles per hour. 35m, 17th, W.; 44m, 18th, S.S.W.; 36m, 19th, S.

*Temperature in ground shelter.

**Reduced to freezing and sea-level.

# DAILY SUMMARY.

| Day. | Barometer Reduced to Sea Level. | | | Temperature. Ground Shelter. | | | | | | | No. Hours of Bright Sunshine. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Maximum | Minimum. | Mean. Semi-daily. | Maximum | Time. | Minimum. | Time. | Mean of Max. and Min. | Mean Hourly Draper. | Mean Sensible Wet Bulb. | |
| 1 | 30.04 | 29.89 | 29.976 | 78.0 | 3 P | 55.5 | 2:30 A | 66.7 | 69.6 | 65.3 | 11.4 |
| 2 | 29.89 | 29.78 | 29.818 | 89.0 | 3:30 P | 65.0 | 5:30 A | 77.0 | 75.3 | 67.7 | 9.3 |
| 3 | 29.94 | 29.82 | 29.891 | 88.0 | 0:30 P | 65.0 | 5:30 A | 76.5 | 70.4 | 63.7 | 7.2 |
| 4 | 30.05 | 29.90 | 29.968 | 82.0 | 3 P | 62.0 | 6 A | 72.0 | 70.5 | 63.5 | 11.3 |
| 5 | 30.12 | 30.04 | 30.082 | 83.5 | 5 P | 54.0 | 4 A | 68.7 | 69.3 | 61.5 | 12.6 |
| 6 | 30.14 | 30.11 | 30.127 | 85.0 | 4 P | 51.5 | 5 A | 68.3 | 68.8 | 61.7 | 11.5 |
| 7 | 30.17 | 30.07 | 30.132 | 84.5 | 3 P | 55.5 | 4:30 A | 70.0 | 70.0 | 62.5 | 11.5 |
| 8 | 30.11 | 30.02 | 30.075 | 81.0 | 0:30 P | 57.0 | 5 A | 69.0 | 68.9 | 61.3 | 9.6 |
| 9 | 30.02 | 29.89 | 29.940 | 74.0 | 4 P | 61.0 | 4:30 A | 67.5 | 66.9 | 60.5 | 10.2 |
| 10 | 29.92 | 29.84 | 29.882 | 71.0 | 11 A | 58.0 | 4:30 A | 64.5 | 64.5 | 60.3 | 7.9 |
| 11 | 29.86 | 29.69 | 29.742 | 66.0 | 11 A | 57.0 | 12 P | 61.5 | 60.4 | 57.7 | 1.5 |
| 12 | 29.77 | 29.66 | 29.706 | 70.0 | 0:30 P | 56.5 | 1 A | 63.3 | 63.7 | 61.0 | 4.8 |
| 13 | 29.87 | 29.73 | 29.802 | 83.0 | 2 P | 63.0 | 6 A | 73.0 | 71.1 | 65.3 | 9.4 |
| 14 | 29.89 | 29.81 | 29.874 | 81.0 | 3:30 P | 62.0 | 5 A | 71.5 | 69.1 | 65.7 | 6.1 |
| 15 | 29.90 | 29.82 | 29.865 | 78.0 | 3:30 P | 62.0 | 5 A | 70.0 | 67.7 | 63.7 | 8.6 |
| 16 | 30.03 | 29.90 | 29.962 | 83.0 | 1 P | 56.0 | 5 A | 69.5 | 70.0 | 62.7 | 11.3 |
| 17 | 30.13 | 30.02 | 30.049 | 79.0 | 4 P | 58.0 | 2 A | 68.5 | 68.3 | 65.5 | 8.7 |
| 18 | 30.08 | 30.04 | 30.062 | 82.0 | 1 P | 65.0 | 0 A | 73.5 | 73.0 | 69.5 | 8.6 |
| 19 | 30.12 | 30.06 | 30.097 | 81.0 | 12 M | 59.5 | 5 A | 70.3 | 73.6 | 70.0 | 7.8 |
| 20 | 30.14 | 30.05 | 30.104 | 87.0 | 3:30 P | 66.5 | 1 A | 76.7 | 74.6 | 69.0 | 10.3 |
| 21 | 30.10 | 30.00 | 30.052 | 82.5 | 12 M | 66.5 | 12 P | 74.5 | 70.4 | 66.7 | 5.7 |
| 22 | 30.00 | 29.88 | 29.938 | 89.0 | 3:30 P | 66.0 | 5 A | 77.5 | 76.2 | 69.7 | 10.7 |
| 23 | 29.94 | 29.88 | 29.916 | 93.0 | 3 P | 69.0 | 5:30 A | 81.0 | 78.5 | 72.0 | 10.8 |
| 24 | 30.15 | 29.94 | 30.060 | 88.0 | 2:30 P | 66.0 | 12 P | 77.0 | 73.5 | 69.7 | 5.5 |
| 25 | 30.22 | 30.15 | 30.187 | 89.0 | 3 P | 62.0 | 5 A | 75.5 | 74.5 | 69.7 | 13.0 |
| 26 | 30.17 | 29.87 | 30.020 | 88.5 | 2:30 P | 70.0 | 6 A | 79.3 | 77.4 | 71.0 | 9.8 |
| 27 | 29.87 | 29.69 | 29.734 | 88.0 | 1 P | 66.0 | 12 P | 77.0 | 77.0 | 69.0 | 8.0 |
| 28 | 29.97 | 29.77 | 29.920 | 79.0 | 4 P | 58.5 | 6 A | 68.7 | 70.0 | 66.5 | 12.2 |
| 29 | 29.95 | 29.73 | 29.847 | 79.0 | 4 P | 63.0 | 3 A | 71.0 | 70.9 | 67.0 | 4.9 |
| 30 | 29.78 | 29.68 | 29.744 | 96.0 | 4 P | 68.0 | 3 A | 82.0 | 83.4 | 76.5 | 12.7 |
| 31 | 29.86 | 29.70 | 29.817 | 98.5 | 5 P | 75.0 | 12 P | 86.7 | 86.4 | 75.5 | 12.5 |

# DAILY SUMMARY.

| Day. | Humidity. | | | Wind. | | | | | Precipitation. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Total in Inches. | |
| | Mean Dew Point. | Mean Force vapor. | Mean Relative Humidity. | Prevailing Direction. | Total Movement in Miles. | Maximum Pressure Per Square Ft | Miles per Hour. | Time. | Beginning. | Ending. | Rain.** | Snow. |
| 1 | 63.5 | .753 | 79.0 | S.W. | 71 | 2.5 | 22 | 5 P | | | | |
| 2 | 66.5 | .770 | 84.0 | S.S.W. | 86 | 2.5 | 22 | 5 P | 5 A | 6 A | .06 | |
| 3 | 60.5 | .718 | 75.0 | S. | 39 | 1.0 | 14 | 4 P | | | | |
| 4 | 60.0 | .722 | 72.5 | S.W. | 47 | 1.0 | 14 | 4 P | | | | |
| 5 | 56.5 | .723 | 63.5 | N.W. | 47 | 0.5 | 10 | 10 A | | | | |
| 6 | 58.0 | .675 | 72.0 | W.N.W. | 15 | 0.0 | — | — | | | | |
| 7 | 59.0 | .712 | 70.0 | W.S.W. | 45 | 0.0 | — | — | | | | |
| 8 | 57.0 | .677 | 69.0 | S.S.W. | 79 | 2.0 | 20 | 1 P | | | | |
| 9 | 57.0 | .624 | 76.0 | S.E. | 71 | 2.0 | 20 | 12 M | 10 A | 4 P | T | |
| 10 | 56 5 | .643 | 70.0 | E. | 25 | 0.0 | — | — | | | | |
| 11 | 55.5 | .520 | 85.0 | E. | 37 | 0.0 | — | — | 10 A | 8:30 P | .95 | |
| 12 | 60.0 | .580 | 89.5 | S.S.E. | 83 | 1.5 | 17 | 4 P | 10 A | 5 P | T | |
| 13 | 63.5 | .690 | 84.5 | S.W. | 36 | 0.0 | — | — | 4 A | 5 A | .01 | |
| 14 | 64.5 | .696 | 86.5 | S.W. | 70 | 3.0 | 24 | 9 P | 7:30 A | 11 P | .10 | |
| 15 | 62 5 | .637 | 88.5 | S. | 94 | 1.0 | 14 | 2 P | 4 P | 5 P | .02 | |
| 16 | 59.0 | .774 | 64.5 | W. | 102 | 2.0 | 20 | 12 M | | | | |
| 17 | 64.0 | .702 | 85.5 | W.S.W. | 5 | 6.0 | 35 | 9 P | 9 P | 12 P | .74 | |
| 18 | 67.5 | .805 | 85.0 | S.S.W. | 126 | 10.0 | 44 | 10 P | 1 P | 3 P | T | |
| 19 | 69.0 | .794 | 88.5 | S.S.W. | 242 | 6.5 | 36 | 12 M | 4 A | 2 P | T | |
| 20 | 67.0 | .802 | 84.0 | S.W. | 100 | 2.0 | 20 | 3 P | | | | |
| 21 | 67.5 | .720 | 88.0 | S.S.W. | 85 | 2.0 | 20 | 2 P | 12 M | 5 P | 1.42 | |
| 22 | 69.5 | .840 | 84.5 | S.S.W. | 44 | 0.0 | — | — | | | | |
| 23 | 71.5 | .851 | 90.0 | S.W. | 20 | 0.0 | — | — | | | | |
| 24 | 68.0 | .763 | 90.5 | S.S.W. | 35 | 3.0 | 24 | 11 A | 5 P | 8 P | .06 | |
| 25 | 68.0 | .824 | 84.5 | S.E. | 27 | 0.0 | — | — | | | | |
| 26 | 69.0 | .860 | 83.0 | S.S.W. | 108 | 2.0 | 20 | 8 A | | | | |
| 27 | 66.5 | .841 | 78.5 | W.N.W. | 83 | 2.0 | 20 | 11 A | | | | |
| 28 | 63.0 | .812 | 71.5 | N.N.W. | 100 | 1.5 | 17 | 10 A | | | | |
| 29 | 65.0 | .754 | 83.5 | S.W. | 60 | 1.0 | 14 | 10 A | 8 A | 4 P | T | |
| 30 | 73.5 | 1.190 | 70.0 | W. | 101 | 2.5 | 22 | 10 A | | | | |
| 31 | 71.5 | 1.197 | 65.0 | N.W. | 50 | 0.5 | 10 | 12 M | | | | |

**Rain or meltedsnow at base of tower. *Included in following day.

## REMARKS

The weather during July, while generally normal, presented a few features of more than passing interest. The most noticeable feature was the storm of the 21st instant. While this storm was only moderately severe at the station—its principal feature being the excessive precipitation—in the immediate vicinity it was of exceptional severity. Only a few miles away the wind approached a hurricane in velocity, and hail did much damage to the growing crops, especially tobacco. The precipitation was also much greater than here and caused washouts on the railroads and much damage to the highways. Only an occasional hailstone was noted here.

The other abnormal feature was the excessive heat and high humidity of the last two days of the month. Both days were exceedingly oppressive, and the month closed without any immediate change in sight.

The records of the several weather elements showed the following features: The mean barometer was practically normal and the range quite small. The total wind movement was only about sixty per cent of the normal, and an unusual amount was from the southwest quadrant. Only a few moderate gales were noted.

The mean hourly temperature was a degree higher than the normal, and the maximum and minimum temperatures were both about five degrees higher than usual.

The mean dew point and relative humidity were both considerably higher than the normal.

The total precipitation was one inch less than the normal. Nearly the whole amount occurred during the three storms on the 11th, 17th, and 21st. The first and last thirds of the month were practically free from rain.

The amount of sunshine was slightly more than normal.

J. E. OSTRANDER, Meteorologist.

W. P. SAUNDERS, Observer.

BULLETIN No. 344. AUGUST, 1917

# Meteorological Observations

AT THE

# MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.
*Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.*
*Height of Wind Instruments 72 ft.*

## MONTHLY SUMMARY.

### **Pressure.** In inches.

| | |
|---|---|
| Maximum reduced to freezing, | 30.00, 31st, 12 M |
| Minimum reduced to freezing, | 29.31, 24th, 3 P |
| Reduced† maximum reading, | 30.29, 31st, 12 M |
| Reduced† minimum reading, | 29.59, 24th, 3 P |
| Mean semi-daily reduced | 30.005 |
| Monthly range | 0.70 |

### ***Air Temperature.** In Degrees Fahr.

| | |
|---|---|
| Highest | 98.0, 1st, 4 P |
| Lowest | 46.0, 27th, 4 A |
| Mean hourly | 70.9 |
| Mean of means of max. and min. | 72.3 |
| Mean sensible (wet bulb) | 65.6 |
| Monthly range | 52.0 |
| Highest mean daily | 83.2, 1st |
| Lowest mean daily | 62.2, 26th |
| Mean maximum | 84.3 |
| Mean minimum | 60.4 |
| Mean daily range | 23.9 |
| Greatest daily range | 39.5, 27th |
| Least daily range | 10.5, 23d |

### **Humidity.**

| | |
|---|---|
| Mean dew point | 63.2 |
| Mean force of vapor | .738 |
| Mean relative humidity | 80.0 |

### **Precipitation.** In inches.

| | |
|---|---|
| Total precipitation, in inches | 7.06 |
| Number of days on which .01 inch or more rain fell | 13 |

*Temperature in ground shelter.

**Reduced to freezing and sea-level.

### **Wind.**

| | |
|---|---|
| Total movement | 2548 m |
| Greatest daily movement | 251m, 28th |
| Least daily movement | 21m, 13th |
| Mean daily movement | 82.0 m |
| Mean hourly velocity | 3.4 m |

Maximum pressure per square foot, 3.5 lbs = 26 m per hour, 2d, 9th, 20th, 28th.

Maximum velocity for 5 minutes 15m per hour, 28th, 2 P, N.E.

Prevailing direction, South Southwest.

Summary.

| | |
|---|---|
| South Southwest | 10 per cent |
| South | 19 " " |
| North Northwest | 16 " " |
| West | 13 " " |
| Other directions | 42 " " |

### **Weather.**

| | |
|---|---|
| Mean cloudiness observed | 50 per cent |
| Total cloudiness recorded by the Sun Thermometer | 142 hours = 33 per cent |
| Number of clear days | 12 |
| Number of fair days | 16 |
| Number of cloudy days | 3 |

### **Bright Sunshine.**

Number hours recorded, 287 hrs, = 67 per cent.

**Rain.** 8th, 9th, 10th, 14th, 15th, 16th, 17th, 18th, 21st, 22d, 23d, 24th, 29th, 30th, 31st.

**Hail,** 21st.

**Thunder and Lightning.** 9th, 10th, 15th, 17th, 21st, 24th, 29th, 30th.

**Gales,** 35 or more miles per hour. None.

# DAILY SUMMARY.

| Day. | Barometer Reduced to Sea Level. | | | Temperature. Ground Shelter. | | | | | | | No. Hours of Bright Sunshine. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Maximum | Minimum. | Mean. Semi-daily. | Maximum | Time. | Minimum. | Time. | Mean of Max. and Min. | Mean Hourly Draper. | Mean Sensible Wet Bulb. | |
| 1 | 29.93 | 29.83 | 29.878 | 98.0 | 4 P | 69.0 | 5 A | 83.5 | 83.2 | 74.0 | 11.0 |
| 2 | 29.88 | 29.74 | 29.861 | 97.0 | 4 P | 72.5 | 6 A | 84.7 | 80.8 | 73.5 | 10.5 |
| 3 | 29.95 | 29.83 | 29.918 | 84.0 | 5 P | 64.0 | 12 P | 74.0 | 73.1 | 64.0 | 10.2 |
| 4 | 30.12 | 29.95 | 30.068 | 82.0 | 2:30 P | 55.0 | 6 A | 68.5 | 68.8 | 62.5 | 13.0 |
| 5 | 30.17 | 30.08 | 30.116 | 86.0 | 6 P | 53.0 | 5 A | 69.5 | 69.7 | 63.5 | 13.0 |
| 6 | 30.09 | 30.04 | 30.069 | 85.5 | 4 P | 56.0 | 6 A | 70.7 | 72.2 | 66.3 | 11.4 |
| 7 | 30.22 | 30.07 | 30.166 | 88.0 | 4:30 P | 64.0 | 6 A | 76.0 | 74.6 | 67.0 | 10.0 |
| 8 | 30.23 | 30.04 | 30.144 | 82.5 | 2:30 P | 59.5 | 5 A | 71.0 | 70.3 | 66.7 | 6.0 |
| 9 | 30.04 | 29.80 | 29.865 | 85.0 | 3:30 P | 69.0 | 12 P | 77.0 | 75.3 | 71.5 | 8.3 |
| 10 | 29.95 | 29.72 | 29.850 | 81.5 | 5 P | 61.0 | 12 P | 71.3 | 69.7 | 64.3 | 10.0 |
| 11 | 30.07 | 29.95 | 30.029 | 85.0 | 3:30 P | 54.5 | 6 A | 69.7 | 68.8 | 64.0 | 12.0 |
| 12 | 30.16 | 30.07 | 30.125 | 88.0 | 3 P | 57.0 | 6 A | 72.5 | 70.8 | 64.3 | 11.8 |
| 13 | 30.20 | 30.14 | 30.180 | 88.5 | 4:30 P | 58.0 | 6 A | 73.3 | 71.2 | 65.0 | 11.3 |
| 14 | 30.19 | 30.14 | 30.167 | 85.0 | 2 P | 61.0 | 5 A | 73.0 | 71.9 | 65.7 | 11.1 |
| 15 | 30.17 | 30.04 | 30.083 | 79.0 | 1:30 P | 65.0 | 12 P | 72.0 | 69.8 | 66.3 | 6.2 |
| 16 | 30.04 | 29.91 | 29.969 | 83.0 | 2 P | 65.0 | 5 A | 74.0 | 70.7 | 67.5 | 7.5 |
| 17 | 29.91 | 29.78 | 29.850 | 80.5 | 1:30 P | 59.0 | 12 P | 69.7 | 68.9 | 67.3 | 6.1 |
| 18 | 29.99 | 29.83 | 29.900 | 80.5 | 5 P | 54.5 | 6 A | 67.5 | 66.0 | 62.5 | 12.0 |
| 19 | 30.06 | 29.96 | 30.015 | 86.0 | 4 P | 53.5 | 6 A | 69.7 | 67.0 | 64.0 | 13.0 |
| 20 | 30.01 | 29.84 | 29.954 | 87.5 | 3:30 P | 63.0 | 5 A | 75.3 | 73.3 | 67.5 | 11.5 |
| 21 | 30.02 | 29.86 | 29.931 | 88.0 | 3 P | 63.0 | 5 A | 75.5 | 71.3 | 67.5 | 8.5 |
| 22 | 30.06 | 29.99 | 30.021 | 75.0 | 4 P | 63.5 | 5 A | 69.3 | 69.1 | 64.5 | 5.7 |
| 23 | 29.99 | 29.74 | 29.890 | 75.0 | 4 P | 64.5 | 6 A | 69.7 | 70.5 | 67.5 | 2.7 |
| 24 | 29.74 | 29.59 | 29.638 | 88.5 | 1:30 P | 70.0 | 3 A | 79.3 | 76.0 | 72.3 | 4.5 |
| 25 | 29.86 | 29.65 | 29.740 | 86.5 | 4 P | 62.0 | 12 P | 74.3 | 73.7 | 67.0 | 10.0 |
| 26 | 30.15 | 29.86 | 30.088 | 77.0 | 5 P | 50.0 | 6:30 A | 63.5 | 62.2 | 54.5 | 12.5 |
| 27 | 30.18 | 30.09 | 30.148 | 85.5 | 3 P | 46.0 | 4 A | 65.7 | 66.3 | 59.3 | 11.0 |
| 28 | 30.09 | 29.96 | 30.051 | 83.5 | 3 P | 62.0 | 5 A | 72.7 | 72.0 | 65.0 | 9.7 |
| 29 | 30.09 | 29.96 | 30.074 | 83.5 | 2 P | 64.0 | 12 P | 73.7 | 68.9 | 64.5 | 6.0 |
| 30 | 30.15 | 30.00 | 30.082 | 78.0 | 12 M | 59.0 | 12 P | 68.5 | 68.0 | 66.0 | 0.0 |
| 31 | 30.29 | 30.15 | 30.284 | 80.5 | 5 P | 54.5 | 6 A | 67.5 | 65.2 | 59.0 | 10.2 |

# DAILY SUMMARY.

| | Humidity. | | | Wind. | | | | | Precipitation. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Total in Inches. | |
| Day. | Mean Dew Point. | Mean Force vapor. | Mean Relative Humidity. | Prevailing Direction. | Total Movement in Miles. | Maximum Pressure Per Square Ft | Miles per Hour. | Time. | Beginning. | Ending. | Rain.** | Snow. |
| 1 | 70.5 | 1.096 | 68.5 | W. | 44 | 2.0 | 20 | 6 P | | | | |
| 2 | 71.5 | .993 | 78.0 | W. | 61 | 3.5 | 26 | 5 P | | | | |
| 3 | 60.5 | .750 | 70.0 | N.N.W. | 41 | 0.5 | 10 | 1 P | | | | |
| 4 | 58.0 | .720 | 68 0 | N.N.W. | 42 | 0.0 | — | — | | | | |
| 5 | 60.5 | .711 | 74 0 | N.N.W. | 32 | 0.0 | — | — | | | | |
| 6 | 63.0 | .785 | 75.0 | S.E. | 86 | 1.5 | 17 | 3 P | | | | |
| 7 | 63.0 | .855 | 68.0 | S. | 64 | 1.5 | 17 | 7 A | | | | |
| 8 | 65.5 | .707 | 91.5 | S. | 74 | 2 5 | 22 | 2 P | 7 A | 8 P | .13 | |
| 9 | 70.0 | .844 | 87.5 | S.S.W. | 179 | 3.5 | 26 | 6 P | 11:30P | 12 P | .60 | |
| 10 | 62.0 | .868 | 85.5 | N.N.W. | 43 | 1.0 | 14 | 1 P | 0 A | 3 A | 2.34 | |
| 11 | 62.0 | .682 | 81 0 | N.W. | 28 | 0.0 | — | — | | | | |
| 12 | 61.0 | .699 | 76.0 | E.S.E. | 25 | 0 0 | — | — | | | | |
| 13 | 61.5 | .718 | 72.0 | N.W. | 21 | 0.5 | 10 | 1 P | | | | |
| 14 | 63.5 | .708 | 80.5 | S.S.W. | 107 | 2.0 | 20 | 3 P | 6:30 A | | T | |
| 15 | 63.5 | .714 | 72.5 | S.S.W. | 110 | 2.5 | 22 | 3 P | 5 P | 12 P | .26 | |
| 16 | 66 5 | .710 | 90.5 | S. | 81 | 0 5 | 10 | 6 P | 8 A | 8 P | .04 | |
| 17 | 67.0 | .685 | 94.0 | S. | 110 | 2.0 | 20 | 12 M | 6 A | 8 P | .88 | |
| 18 | 60.5 | .640 | 82.5 | N.N.W. | 75 | 1.0 | 14 | 5 P | 2 A | 4 A | .22 | |
| 19 | 60.5 | .644 | 73.0 | W. | 53 | 0.5 | 10 | 2 P | | | | |
| 20 | 65.0 | .802 | 77.0 | S. | 184 | 3.5 | 26 | 4 P | | | | |
| 21 | 66.0 | .730 | 88.0 | W.N.W. | 79 | 0.0 | — | — | 3 P | 12 P | .21 | |
| 22 | 61.5 | .717 | 77.0 | E.N.E. | 23 | 0.0 | — | — | 8 P | 12 P | T | |
| 23 | 66.5 | .726 | 89 0 | E. | 42 | 0.0 | — | — | 8 A | 12 P | .03 | |
| 24 | 71.5 | .850 | 90.0 | S. | 159 | 2.0 | 20 | 1 P | 0 A | 12 P | .26 | |
| 25 | 64.0 | .770 | 79.5 | E.S.E. | 84 | 2.0 | 20 | 3 P | | | | |
| 26 | 51.0 | .499 | 75.0 | S.E. | 142 | 2.5 | 22 | 9 A | | | | |
| 27 | 56.0 | .611 | 76 0 | E. | 63 | 0.5 | 10 | 1 P | | | | |
| 28 | 61.5 | .754 | 72.5 | N.E. | 251 | 3.5 | 26 | 2 P | | | | |
| 29 | 63.0 | .663 | 87.5 | N.E. | 116 | 2.5 | 22 | 2 P | 1 P | 10 P | 1.80 | |
| 30 | 65.5 | .660 | 96.0 | N. | 67 | 2.0 | 20 | 11 A | 1 A | 6 P | .28 | |
| 31 | 56.5 | .562 | 83.0 | W. | 62 | 0.0 | — | — | 0 A | 2 A | .01 | |

**Rain or melted snow at base of tower.

*Included in following day.

## REMARKS

The weather during August was marked by an unusual number of thunder storms of more than ordinary severity with heavy precipitation. One of the storms was accompanied by much hail in the immediate vicinity of the station and considerable damage was done to tobacco and fruit. The storm on the night of the 9th and 10th was one of the heaviest downpours here in many years, nearly three inches of rain falling in about three hours. High temperatures were in evidence most of the month, the thermometer registering 80 degrees or more on 26 days. The highest temperature of the month was reached on the 1st during the hot wave which started the latter part of July, and continued the first two days of this month.

Comparing the records with the normals for this station the following features are noted : The barometer record was practically normal in every respect. The total wind movement was considerably less than normal and not a single gale was recorded on the wind-pressure chart. The wind direction was more variable than usual.

The mean temperature was more than three degrees above the normal and the range a little larger than usual. Both the maximum and minimum were several degrees higher that their respective normals. There was no approach to the temperature for frost at any time.

The mean dew point and relative humidity were both several points above their normals.

The total precipitation was about seventy per cent more than the normal.

Notwithstanding the large precipitation the amount of sunshine was considerably more than usual, and only three days were recorded as cloudy.

J. E. OSTRANDER, Meteorologist.

H. B. MILLARD, Acting Observer.

BULLETIN No. 345. SEPTEMBER, 1917

# Meteorological Observations
AT THE
# MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.
*Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.*
*Height of Wind Instruments 72 ft.*

## MONTHLY SUMMARY.

**Pressure.** In inches.

| | |
|---|---|
| Maximum reduced to freezing, | 30.24, 23d. 8 A |
| Minimum reduced to freezing, | 29.20, 30th, 4 P |
| Reduced maximum reading, | 30.54, 23d, 8 A |
| Reduced† minimum reading, | 29.49, 30th, 4 P |
| Mean semi-daily reduced | 30.107 |
| Monthly range | 1.05 |

***Air Temperature.** In Degrees Fahr.

| | |
|---|---|
| Highest | 85.0, 19th, 3 P |
| Lowest | 30.5, 11th, 6 A. 24th, 5 A |
| Mean hourly | 57.0 |
| Mean of means of max. and min. | 58.4 |
| Mean sensible (wet bulb) | 52.1 |
| Monthly range | 54.5 |
| Highest mean daily | 67.9, 2d |
| Lowest mean daily | 45.9, 11th |
| Mean maximum | 72.8 |
| Mean minimum | 44.0 |
| Mean daily range | 28.8 |
| Greatest daily range | 41.0, 19th |
| Least daily range | 6.5, 1st |

**Humidity.**

| | |
|---|---|
| Mean dew point | 49.7 |
| Mean force of vapor | .436 |
| Mean relative humidity | 83.5 |

**Precipitation.** In inches.

| | |
|---|---|
| Total precipitation, in inches | 2.42 |
| Total snow, in inces | |
| Number of days on which .01 inch or more rain fell | 5 |
| Days of sleighing, | |

**Wind.**

| | |
|---|---|
| Total movement | 1702 m |
| Greatest daily movement | 179m, 10th |
| Least daily movement | 1m, 26th |
| Mean daily movement | 57.0 m |
| Mean hourly velocity | 2.4 m |

Maximum pressure per square foot, 3.5 lbs = 26 m per hour, 6th, 7 A, N.

Maximum velocity for 5 minutes 16m per hour, 6th, 7 A, N.

Prevailing direction, East.

Summary.

| | |
|---|---|
| East | 20 per cent |
| Southwest | 13 " " |
| Northeast | 10 " " |
| North | 10 " " |
| Other directions | 47 " " |

**Weather.**

| | |
|---|---|
| Mean cloudiness observed | 39 per cent |
| Total cloudiness recorded by the Sun Thermometer | 133 hours = 36 per cent |
| Number of clear days | 13 |
| Number of fair days | 11 |
| Number of cloudy days | 6 |

**Bright Sunshine.**

Number hours recorded, 240 hrs, = 64 per cent.

**Rain,** 1st, 2d 8th, 20th, 21st, 28th, 30th.

**Thunder and Lightning,** 1st, 2d, 20th, 30th

**Frosts,** 11th, 12th, 23d, 24th.

**Gales,** 35 or more miles per hour. None.

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*Temperature in ground shelter.

**Reduced to freezing and sea-level.

# DAILY SUMMARY.

| Day. | Barometer Reduced to Sea Level. | | | Temperature. Ground Shelter. | | | | | | | No. Hours of Bright Sunshine. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Maximum | Minimum. | Mean. Semi-daily. | Maximum | Time. | Minimum. | Time. | Mean of Max. and Min. | Mean Hourly Draper. | Mean Sensible Wet Bulb. | |
| 1 | 30.31 | 30.20 | 30.261 | 61.0 | 1 P | 54.5 | 6 A | 57.7 | 58.6 | 57.5 | 0.0 |
| 2 | 30.20 | 29.96 | 30 050 | 82.5 | 3 P | 58.5 | 4 A | 70.5 | 67.9 | 64.7 | 8.3 |
| 3 | 30.03 | 29.96 | 30.023 | 78.0 | 1 P | 57.0 | 12 P | 67.5 | 67.0 | 60.0 | 11.0 |
| 4 | 30.18 | 30.03 | 30.103 | 72 5 | 2:30 P | 51.0 | 12 P | 61.7 | 61.2 | 55.0 | 9.7 |
| 5 | 30.24 | 30.06 | 30.161 | 73.5 | 2:30 P | 43 0 | 6 A | 58.3 | 56.3 | 50 5 | 11.5 |
| 6 | 30.06 | 29.74 | 29.861 | 72.0 | 4 P | 46.0 | 0 A | 59.0 | 59.3 | 56.0 | 2.3 |
| 7 | 30.13 | 29.92 | 30.101 | 73.0 | 3:30 P | 42.0 | 6 A | 57.5 | 56.0 | 48.5 | 11.4 |
| 8 | 30.17 | 30.11 | 30.156 | 65.5 | 5 P | 45.0 | 12 P | 55 3 | 52.7 | 49.0 | 7.3 |
| 9 | 30.14 | 29.94 | 30.054 | 71.0 | 3 P | 43.5 | 5 A | 57.3 | 55.2 | 50.0 | 7.5 |
| 10 | 30.17 | 29 94 | 30.114 | 61.0 | 4 P | 36.0 | 12 P | 48.5 | 50.4 | 42 3 | 8.0 |
| 11 | 30.23 | 30.13 | 30.222 | 63.0 | 2:30 P | 30.5 | 6 A | 46.7 | 45.9 | 41.5 | 10.6 |
| 12 | 30.31 | 30.21 | 30 273 | 74 5 | 4 P | 34.0 | 6:30 A | 54.3 | 53.0 | 46.0 | 11.7 |
| 13 | 30.31 | 30.24 | 30.293 | 80.0 | 3 P | 39.5 | 6 A | 59.7 | 57.0 | 49.7 | 10.9 |
| 14 | 30.33 | 30 24 | 30.319 | 82.0 | 3 P | 42.0 | 6 A | 62.0 | 59.2 | 51 3 | 10.5 |
| 15 | 30.37 | 30.32 | 30.338 | 75.0 | 2 P | 44.0 | 6 A | 59.5 | 58.9 | 54.5 | 9.5 |
| 16 | 30.39 | 30.33 | 30.359 | 64.0 | 1:30 P | 46.0 | 12 P | 55.0 | 56.1 | 53.5 | 4.0 |
| 17 | 30.33 | 30.00 | 30.165 | 70.0 | 2:30 P | 41 0 | 5 A | 55.5 | 55.4 | 52.7 | 7.9 |
| 18 | 30.00 | 29.81 | 29 908 | 81.0 | 3 P | 50.5 | 4:30 A | 65.7 | 62 6 | 55.3 | 9.8 |
| 19 | 29.95 | 29.83 | 29.917 | 85.0 | 3 P | 44.0 | 6 A | 64 5 | 62.7 | 56.3 | 10.5 |
| 20 | 29.89 | 29.82 | 29.876 | 81.0 | 1:30 P | 52.5 | 6:30 A | 66.7 | 64.6 | 59 5 | 6.8 |
| 21 | 29.97 | 29 84 | 29.903 | 76.0 | 4 P | 48 0 | 12 P | 62.0 | 61.3 | 52.0 | 8.0 |
| 22 | 30.41 | 29.97 | 30.194 | 65.0 | 4 P | 40.0 | 12 P | 52.5 | 50.6 | 47.3 | 11.0 |
| 23 | 30 54 | 30.41 | 30.519 | 68.5 | 2 P | 32.0 | 6 A | 50.3 | 48.1 | 43.5 | 11.1 |
| 24 | 30.52 | 30 30 | 30.403 | 68.5 | 2 P | 30.5 | 5 A | 49 5 | 48.9 | 45.5 | 9 5 |
| 25 | 30.30 | 30.13 | 30.197 | 76.0 | 3 P | 47.0 | 12 P | 61.5 | 57.8 | 51.0 | 0.0 |
| 26 | 30.18 | 30.09 | 30.137 | 79.0 | 3 P | 42.5 | 5 A | 60.7 | 54.9 | 51.3 | 8.3 |
| 27 | 30.13 | 29.93 | 30.046 | 79.0 | 3 P | 45.0 | 5 A | 62.0 | 59.5 | 55.0 | 8.0 |
| 28 | 29.93 | 29 76 | 29.833 | 69 5 | 2 P | 48.0 | 12 P | 58.7 | 59.5 | 58.5 | 2.1 |
| 29 | 29 89 | 29.70 | 29.833 | 69 5 | 2 P | 43.5 | 6 A | 56.5 | 56 5 | 53.0 | 10.0 |
| 30 | 29.70 | 29 49 | 29.599 | 67.0 | 3 P | 43.5 | 6 A | 55.3 | 51.5 | 50.0 | 2.9 |

# DAILY SUMMARY.

| Day. | Humidity. | | | Wind. | | | | | Precipitation. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Mean Dew Point. | Mean Force vapor. | Mean Relative Humidity. | Prevailing Direction. | Total Movement in Miles. | Maximum Pressure Per Square Ft | Miles per Hour. | Time. | Beginning. | Ending. | Total in Inches. | |
| | | | | | | | | | | | Rain.** | Snow. |
| 1 | 56.5 | .504 | 90.5 | N.N.W. | 42 | 0.0 | — | — | 10 A | 2 P | .22 | |
| 2 | 64.0 | .653 | 92.5 | N. | 67 | 1.0 | 14 | 1 P | 7 P | 8 P | .46 | |
| 3 | 55.5 | .630 | 67.5 | S.S.E. | 42 | 0.0 | — | — | | | | |
| 4 | 51.5 | .508 | 75.0 | S. | 106 | 1.0 | 14 | 10 A | | | | |
| 5 | 48.0 | .394 | 87.0 | S.S.W. | 58 | 0.5 | 10 | 8 A | | | | |
| 6 | 52.5 | .531 | 75.0 | E. | 130 | 3.5 | 26 | 7 A | | | | |
| 7 | 44.5 | .396 | 75.0 | S.W. | 31 | 0.0 | — | — | | | | |
| 8 | 47.5 | .359 | 90.0 | N.W. | 37 | 0.0 | — | — | 2 A | 9:30 A | | |
| 9 | 51.0 | .385 | 90.5 | N.E. | 45 | 1.0 | 14 | 12 M | | | | |
| 10 | 37.5 | .311 | 73.5 | W.S.W. | 179 | 2.5 | 22 | 10 A | | | | |
| 11 | 39.0 | .287 | 84.0 | S.W. | 37 | 1.0 | 14 | 1 P | | | | |
| 12 | 44.5 | .342 | 87.0 | E. | 34 | 0.5 | 10 | 12 M | | | | |
| 13 | 47.0 | .378 | 87.5 | E. | 18 | 0.0 | — | — | | | | |
| 14 | 48.5 | .438 | 81.5 | E.N.E. | 24 | 0.0 | — | — | | | | |
| 15 | 51.5 | .485 | 80.0 | S.W. | 49 | 0.5 | 10 | 12 M | | | | |
| 16 | 51.5 | .451 | 84.0 | S. | 68 | 0.0 | — | — | | | | |
| 17 | 52.5 | .415 | 95.5 | S.S.E. | 42 | 0.5 | 10 | 9 A | | | | |
| 18 | 52.5 | .484 | 83.5 | E.S.E. | 103 | 2.0 | 20 | 12 M | | | | |
| 19 | 53.0 | .530 | 79.5 | N.N.E. | 15 | 0.5 | 10 | 2 P | | | | |
| 20 | 58.5 | .531 | 93.0 | N. | 45 | 0.5 | 10 | 2 P | 2:30 P | | T | |
| 21 | 49.0 | .475 | 83.0 | E. | 54 | 1.0 | 14 | 1 P | 8:30 A | 9 A | T | |
| 22 | 44.5 | .352 | 81.5 | S.W. | 106 | 2.0 | 20 | 10 A | | | | |
| 23 | 38.5 | .320 | 69.5 | S.E. | 39 | 0.5 | 10 | 7 P | | | | |
| 24 | 43.5 | .332 | 87.5 | N.E. | 7 | 0.0 | — | — | | | | |
| 25 | 49.0 | .401 | 87.0 | E.S.E. | 19 | 0.0 | — | — | | | | |
| 26 | 49.5 | .387 | 89.0 | E.N.E. | 1 | 0.0 | — | — | | | | |
| 27 | 54.0 | .463 | 91.0 | N.E. | 35 | 1.0 | 14 | 11 P | | | | |
| 28 | 57.0 | .515 | 87.5 | E. | 163 | 1.5 | 17 | 3 A | 2 A | 9 A | .28 | |
| 29 | 49.0 | .440 | 74.5 | N. | 75 | 1.5 | 17 | 2 P | | | | |
| 30 | 48.5 | .373 | 92.0 | E. | 31 | 2.5 | 22 | 4 P | 9:30 A | 7:30 P | .74 | |

**Rain or melted snow at base of tower. *Included in following day.

## REMARKS

The weather during September while generally pleasant was considerably cooler than usual, and the precipitation was comparatively light. While the first frost was about a week earlier than the average date for this locality, it was much more severe than the ordinary first frost of a season, and the resulting damage caused, especially to corn on account of the generally backward condition of growth, was much greater than is usually the case. Other crops were damaged to some extent, but the loss was much less than that of the corn. A comparatively small wind movement with many calm periods caused an unusually abnormal wind direction and a much varied record of daily prevailing directions. The precipitation record showed a period of nearly three weeks without a measurable amount of rain.

The records of the several weather elements compared with their respective normals show the following features of more or less interest: The mean barometer was higher than the normal and the range considerably more than usual. During much of the period of high barometer the wind movement was very small, resulting in a total wind movemeat of but little more than one-half the usual amount.

The mean hourly temperature was more than four degrees lower than the normal, and the maximum and minimum were both about two degrees lower than their normals.

The mean dew point was about four degrees lower than usual, and the relative humidity considerably higher than the average value.

The total precipitation was about sixty per cent. of the normal and nearly all of it occurred during three showers of moderate intensity.

The amount of sunshine was considerably more than normal, and only six cloudy days were noted.

J. E. OSTRANDER, Meteorologist.

H. B. MILLARD, Acting Observer.

BULLETIN No. 346. OCTOBER, 1917

# Meteorological Observations
AT THE
# MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.
*Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.*
*Height of Wind Instruments 72 ft.*

## MONTHLY SUMMARY.

### **Pressure.** In inches.

| | |
|---|---|
| Maximum reduced to freezing, | 30.10, 18th. 9 A |
| Minimum reduced to freezing, | 28.98, 30th, 4 P |
| Reduced maximum reading, | 30.40, 18th, 9A; 23d, 8 A. |
| Reduced† minimum reading, | 2 .29, 30th, 4 P |
| Mean semi-daily reduced | 30.052 |
| Monthly range | 1.11 |

### ***Air Temperature.** In Degrees Fahr.

| | |
|---|---|
| Highest | 70.0, 27th, 3 P |
| Lowest | 27.0, 21st, 6 A |
| Mean hourly | 47.0 |
| Mean of means of max. and min. | 47.4 |
| Mean sensible (wet bulb) | 43.5 |
| Monthly range | 43.0 |
| Highest mean daily | 60.1, 19th |
| Lowest mean daily | 37.7, 31st |
| Mean maximum | 57.9 |
| Mean minimum | 36.8 |
| Mean daily range | 21.1 |
| Greatest daily range | 31.5. 2d, 3d |
| Least daily range | 5.5, 24th |

### **Humidity.**

| | |
|---|---|
| Mean dew point | 40.0 |
| Mean force of vapor | .317 |
| Mean relative humidity | 79.6 |

### **Precipitation.** In inches.

| | |
|---|---|
| Total precipitation, in inches | 6.60 |
| Total snow, in inces | |
| Number of days on which .01 inch or more rain fell | 12 |
| Days of sleighing, | |

### **Wind.**

| | |
|---|---|
| Total movement | 4118 m |
| Greatest daily movement | 469m, 30th |
| Least daily movement | 23m, 17th |
| Mean daily movement | 133.0 m |
| Mean hourly velocity | 5.5 m |

Maximum pressure per square foot, 17.0 lbs = 58 m per hour, 30th, 9 A, S.W.

Maximum velocity for 5 minutes 36m per hour, 30th, 10 A, S.W.

Prevailing direction, South Southwest.

Summary.

| | |
|---|---|
| South | 19 per cent |
| South Southwest | 19 " " |
| Southwest | 13 " " |
| Southeast | 10 " " |
| Northeast | 10 " " |
| Other directions | 28 " " |

### **Weather.**

| | |
|---|---|
| Mean cloudiness observed | 55 per cent |
| Total cloudiness recorded by the Sun Thermometer | 205 hours = 59 per cent |
| Number of clear days | 10 |
| Number of fair days | 5 |
| Number of cloudy days | 16 |

### **Bright Sunshine.**

Number hours recorded, 142 hrs, = 41 per cent.

**Rain.** 5th, 8th, 9th, 10th, 12th. 15th, 19th, 20th, 24th, 27th, 28th, 30th.

**Thunder and Lightning.** 5th, 15th, 27th.

**Frosts.** 7th, 13th. 17th, 21st, 23d, 29th, 31st.

**Gales.** 35 or more miles per hour. 41m, 19th, S.; 51m, 24th, S.; 44m, 28th. S.W.: 58m, 30th, S.W.

---

*Temperature in ground shelter.

**Reduced to freezing and sea-level.

# DAILY SUMMARY.

| Day. | Barometer Reduced to Sea Level. | | | Temperature. Ground Shelter. | | | | | | | No. Hours of Bright Sunshine |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Maximum | Minimum. | Mean. Semi-daily | Maximum | Time. | Minimum. | Time. | Mean of Max. and Min. | Mean Hourly Draper. | Mean Sensible Wet Bulb. | |
| 1 | 30.04 | 29.59 | 29.823 | 60.0 | 3 P | 42.0 | 12 P | 51.0 | 50.9 | 47.3 | 3.3 |
| 2 | 30.26 | 30.04 | 30.246 | 67.0 | 3 P | 35.5 | 6 A | 51.3 | 50.2 | 48.5 | 6.5 |
| 3 | 30.23 | 29.91 | 30.086 | 69.0 | 3 P | 37.5 | 5 A | 53.3 | 52.7 | 49.0 | 8.0 |
| 4 | 29.91 | 29.62 | 29.773 | 65.0 | 1 P | 42.0 | 12 P | 53.5 | 53.8 | 48.7 | 1.8 |
| 5 | 29.94 | 29.86 | 29.900 | 53.0 | 2 P | 37.0 | 2 A | 45.0 | 46.4 | 46.3 | 0.6 |
| 6 | 30.18 | 29.91 | 30.030 | 60.0 | 3:30 P | 41.0 | 12 P | 50.5 | 50.1 | 46.5 | 6.7 |
| 7 | 30.28 | 30.18 | 30.244 | 61.0 | 4 P | 31.5 | 7 A | 46.3 | 46.2 | 43.3 | 9.4 |
| 8 | 30.18 | 30.00 | 30.093 | 58.5 | 2 P | 39.0 | 6:30 A | 48.8 | 49.2 | 45.5 | 3.9 |
| 9 | 30.20 | 30.10 | 30.193 | 46.0 | 1 P | 39.0 | 12 P | 42.5 | 42.1 | 40.3 | 0.2 |
| 10 | 30.14 | 30.11 | 30.134 | 46.5 | 4 P | 39.0 | 2 A | 42.8 | 42.4 | 41.3 | 0.7 |
| 11 | 30.14 | 30.00 | 30.060 | 46.5 | 4 P | 32.0 | 12 P | 39.8 | 41.0 | 39.8 | 0.1 |
| 12 | 30.07 | 29.67 | 29.926 | 57.0 | 3:30 P | 29.5 | 1 A | 43.3 | 43.0 | 41.0 | 1.2 |
| 13 | 30.10 | 29.78 | 29.981 | 55.5 | 2 P | 32.0 | 6:30 A | 43.8 | 44.2 | 40.0 | 6.7 |
| 14 | 30.19 | 30.03 | 30.119 | 60.0 | 3 P | 34.5 | 7 A | 47.3 | 46.7 | 40.0 | 9.5 |
| 15 | 30.03 | 29.74 | 29.839 | 63.5 | 12 M | 46.0 | 3 A | 54.7 | 51.7 | 50.0 | 1.7 |
| 16 | 30.18 | 29.84 | 30.038 | 63.0 | 2 P | 39.0 | 12 P | 51.0 | 50.9 | 44.7 | 9.8 |
| 17 | 30.38 | 30.18 | 30.337 | 61.0 | 4 P | 30.5 | 5 A | 45.7 | 43.7 | 38.0 | 10.0 |
| 18 | 30.40 | 30.24 | 30.337 | 62.0 | 2 P | 41.0 | 2 A | 51.5 | 49.5 | 46.0 | 2.8 |
| 19 | 30.24 | 29.80 | 29.979 | 69.0 | 3 P | 47.0 | 12 P | 58.0 | 60.1 | 60.3 | 1.9 |
| 20 | 30.20 | 29.88 | 30.093 | 50.0 | 1 P | 33.0 | 12 P | 41.5 | 43.3 | 37.5 | 1.1 |
| 21 | 30.30 | 30.07 | 30.215 | 55.5 | 4 P | 27.0 | 6 A | 41.3 | 41.0 | 34.7 | 9.5 |
| 22 | 30.25 | 30.01 | 30.109 | 57.5 | 2:30 P | 36.0 | 6 A | 47.7 | 45.2 | 38.7 | 9.5 |
| 23 | 30.40 | 30.25 | 30.372 | 57.0 | 4 P | 28.5 | 7 A | 42.7 | 42.1 | 38.0 | 8.8 |
| 24 | 30.29 | 29.54 | 29.881 | 46.5 | 8 P | 41.0 | 12 P | 43.7 | 43.7 | 45.0 | 0.0 |
| 25 | 29.99 | 29.61 | 29.857 | 51.0 | 2 P | 41.5 | 7 A | 46.3 | 44.0 | 40.5 | 3.5 |
| 26 | 30.15 | 29.99 | 30.110 | 61.5 | 3 P | 37.5 | 7 A | 49.5 | 47.8 | 41.5 | 9.1 |
| 27 | 30.08 | 29.83 | 30.015 | 70.0 | 3 P | 44.5 | 0 A | 56.7 | 55.7 | 52.3 | 7.0 |
| 28 | 30.22 | 29.74 | 30.108 | 56.0 | 0 A | 38.0 | 12 P | 47.0 | 48.8 | 40.3 | 8.7 |
| 29 | 30.22 | 29.77 | 30.060 | 54.5 | 9 P | 28.5 | 6 A | 41.5 | 43.2 | 41.3 | 1.0 |
| 30 | 29.79 | 29.29 | 29.565 | 66.0 | 12 M | 39.5 | 12 P | 52.7 | 50.2 | 50.0 | 0.0 |
| 31 | 30.11 | 29.79 | 30.078 | 47.5 | 2 P | 32.0 | 6 A | 39.7 | 37.7 | 33.7 | 8.0 |

# DAILY SUMMARY.

| Day. | Humidity. | | | Wind. | | | | | Precipitation. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Total in Inches. | |
| | Mean Dew Point. | Mean Force vapor. | Mean Relative Humidity. | Prevailing Direction. | Total Movement in Miles. | Maximum Pressure Per Square Ft | Miles per Hour. | Time. | Beginning. | Ending. | Rain.** | Snow. |
| 1 | 43.5 | .357 | 77.0 | W.N.W. | 98 | 2.0 | 20 | 3 P | | | | |
| 2 | 46.0 | .374 | 86.5 | S.W. | 30 | 0.0 | — | — | | | | |
| 3 | 47.0 | .362 | 84.0 | S.S.W. | 142 | 4.0 | 28 | 2 P | | | | |
| 4 | 45.5 | .378 | 84.5 | S.S.W. | 196 | 3.0 | 24 | 9 A | | | | |
| 5 | 44.5 | .318 | 89.5 | N.W. | 33 | 0.0 | — | — | 8 A | 10 P | .35 | |
| 6 | 44.5 | .338 | 87.5 | N.N.W. | 75 | 1.5 | 17 | 2 P | | | | |
| 7 | 40.5 | .296 | 80.5 | S. | 73 | 1.5 | 17 | 5 P | | | | |
| 8 | 42.0 | .292 | 78.0 | S.S.W. | 144 | 3.5 | 26 | 2 P | 6 P | 8 P | .15 | |
| 9 | 37.5 | .263 | 82.5 | N.E. | 101 | 2.0 | 20 | 9 A | 3 P | 10:30 P | .09 | |
| 10 | 35.5 | .282 | 66.5 | E.N.E. | 87 | 1.0 | 14 | 8 A | 9:30 P | 11 P | .01 | |
| 11 | 38.5 | .244 | 92.0 | N.E. | 64 | 0.5 | 10 | 3 P | | | | |
| 12 | 39.5 | .270 | 91.5 | N.E. | 103 | 5.5 | 33 | 6 P | 3 P | 11 P | .78 | |
| 13 | 35.0 | .284 | 69.5 | S.W. | 110 | 2.0 | 20 | 2 P | | | | |
| 14 | 35.5 | .292 | 69.5 | S.S.W. | 85 | 2.0 | 20 | 12 P | | | | |
| 15 | 47.0 | .388 | 81.5 | S.S.W. | 247 | 5.5 | 33 | 12 M | 12:30 P | 4 P | .15 | |
| 16 | 39.5 | .338 | 71.0 | W.N.W. | 133 | 5.5 | 33 | 3 P | | | | |
| 17 | 35.0 | .248 | 81.0 | S.W. | 23 | 0.0 | — | — | | | | |
| 18 | 42.5 | .337 | 78.5 | S. | 81 | 2.5 | 22 | 6 P | | | | |
| 19 | 59.0 | .556 | 89.5 | S. | 243 | 8.5 | 41 | 12 M | 2 P | 12 P | .05 | |
| 20 | 34.0 | .245 | 80.0 | S.E. | 164 | 1.5 | 17 | 4 A | 0 A | 9 A | .38 | |
| 21 | 28.5 | .232 | 67.0 | S. | 47 | 1.0 | 14 | 2 P | | | | |
| 22 | 33.5 | .269 | 71.5 | S.E. | 78 | 1.5 | 17 | 3 P | | | | |
| 23 | 33.5 | .263 | 74.5 | S.E. | 44 | 1.0 | 14 | 7 P | | | | |
| 24 | 44.0 | .304 | 94.0 | S. | 224 | 13.0 | 51 | 5 P | 8 A | 11:30 P | 1.01 | |
| 25 | 37.5 | .274 | 83.0 | N. | 236 | 2.5 | 22 | 8 A | | | | |
| 26 | 38.0 | .305 | 79.5 | N. | 121 | 1.5 | 17 | 6 P | | | | |
| 27 | 51.0 | .422 | 89.5 | S. | 128 | 3.5 | 26 | 12 P | 8:30 P | 12 P | .85 | |
| 28 | 31.0 | .316 | 58.0 | S.W. | 295 | 9.5 | 44 | 1 A | 0 A | 1 A | .05 | |
| 29 | 35.0 | .314 | 68.5 | W.S.W. | 78 | 3.0 | 24 | 3 P | | | | |
| 30 | 48.0 | .445 | 84.5 | S.S.W. | 469 | 17.0 | 58 | 9 A | 0 A | 7 P | 2.73 | |
| 31 | 29.5 | .214 | 77.5 | W. | 166 | 0.0 | — | — | | | | |

**Rain or melted snow at base of tower. *Included in following day.

## REMARKS

The weather during October was less pleasant than usual, owing to the large number of cloudy days and comparatively cool temperature. The precipitation record was also unusually large, which added to the general discomfort. The rainstorm on the 30th was unusually heavy for this locality and was accompanied by a very high wind and low barometer.

A comparison of the records of the several weather elements with their normals for this station shows the following as the more important features: The mean barometer was practically normal while the maximum and minimum records were both considerably lower than their normals. The range of pressure was about the usual amount. The total wind movement was nearly the normal amount, but the prevailing direction was much nearer the south point than usual.

The mean temperature was about three degrees lower than normal and the maximum was nine degrees lower than usual, and came unusually late in the month. The minimum temperature was nearly four degrees higher than usual, giving an unusually small range. Several frosts were noted, but, owing to the killing frost which occurred in September, they did no especial damage.

The mean dew point was slightly lower than usual and the relative humidity comparatively high.

The total precipitation was about three inches more than the average value for October—the storm of the 30th furnishing nearly all of this surplus.

The amount of sunshine was less than 80 per cent of the normal amount.

J. E. OSTRANDER, Meteorologist.

H. B. MILLARD, Observer.

BULLETIN No. 347. NOVEMBER, 1917

# Meteorological Observations
# AT THE
# MASSACHUSETTS
# AGRICULTURAL EXPERIMENT
# STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.
*Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.*
*Height of Wind Instruments 72 ft.*

---

## MONTHLY SUMMARY.

**Pressure.** In inches.

| | |
|---|---|
| Maximum reduced to freezing, | 30.25, 4th. 8 P |
| Minimum reduced to freezing, | 29.15, 22d, 11 P |
| Reduced maximum reading, | 30.54, 4th, 8 P |
| Reduced† minimum reading, | 29.46, 22d, 11 P |
| Mean semi-daily reduced | 30.065 |
| Monthly range | 1.08 |

***Air Temperature.** In Degrees Fahr.

| | |
|---|---|
| Highest | 62.0, 6th, 2 P |
| Lowest | 7.0, 29th, 7 A |
| Mean hourly | 33.3 |
| Mean of means of max. and min. | 34.6 |
| Mean sensible (wet bulb) | 28.4 |
| Monthly range | 55.0 |
| Highest mean daily | 41.7, 6th |
| Lowest mean daily | 16.4, 27th |
| Mean maximum | 45.5 |
| Mean minimum | 23.6 |
| Mean daily range | 21.9 |
| Greatest daily range | 38.0, 6th, 15th |
| Least daily range | 7.0, 22d |

**Humidity.**

| | |
|---|---|
| Mean dew point | 22.2 |
| Mean force of vapor | .180 |
| Mean relative humidity | 71.1 |

**Precipitation.** In inches.

| | |
|---|---|
| Total precipitation, in inches | 0.63 |
| Total snow, in inches | ¾ |
| Number of days on which .01 inch or more rain fell | 4 |
| Days of sleighing, | |

**Wind.**

| | |
|---|---|
| Total movement | 3721 m |
| Greatest daily movement | 356m, 25th |
| Least daily movement | 1m, 30th |
| Mean daily movement | 124.0 m |
| Mean hourly velocity | 5.2 m |

Maximum pressure per square foot, 6.5 lbs = 36m per hour, 25th, 6 A, W.N.W.; 26th, 9A, N.N.W.

Maximum velocity for 5 minutes 24m per hour, 26th, 9 A, N.N.W.

Prevailing direction, Northwest.

Summary.

| | |
|---|---|
| North Northwest | 27 per cent |
| North | 17 " " |
| West | 17 " " |
| Northwest | 13 " " |
| Other directions | 26 " " |

**Weather.**

| | |
|---|---|
| Mean cloudiness observed | 34 per cent |
| Total cloudiness recorded by the Sun Thermometer | 123 hours = 42 per cent |
| Number of clear days | 12 |
| Number of fair days | 9 |
| Number of cloudy days | 9 |

**Bright Sunshine.**

Number hours recorded, 170 hrs, = 58 per cent.

**Rain,** 21st, 22d, 23d, 24th.

**Snow,** 24th, 28th.

**Gales,** 35 or more miles per hour. 36m, 25th W.N.W.; 36m, 26th, N.N.W.

*Temperature in ground shelter.

**Reduced to freezing and sea-level.

# DAILY SUMMARY.

| Day. | Barometer Reduced to Sea Level. | | | Temperature. Ground Shelter. | | | | | | | No. Hours of Bright Sunshine |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Maximum | Minimum. | Mean. Semi-daily | Maximum | Time. | Minimum. | Time. | Mean of Max. and Min. | Mean Hourly Draper. | Mean Sensible Wet Bulb. | |
| 1 | 30.24 | 30.09 | 30.227 | 49.0 | 3:30 P | 25.5 | 7 A | 36.3 | 35.4 | 26.5 | 8.0 |
| 2 | 30.28 | 30.18 | 30.263 | 48.0 | 2:30 P | 27.0 | 6:30 A | 37.5 | 34.9 | 30.0 | 8.2 |
| 3 | 30.31 | 30.05 | 30.200 | 44 5 | 3 P | 25.5 | 3 A | 35.0 | 34.0 | 30.5 | 1.7 |
| 4 | 30.54 | 30.31 | 30.513 | 44.5 | 3 P | 29.5 | 12 P | 37.0 | 35 9 | 30.0 | 8.3 |
| 5 | 30.48 | 30.16 | 30.345 | 55.0 | 3:30 P | 25.0 | 6:30 A | 40.0 | 38.4 | 32.0 | 9.3 |
| 6 | 30.16 | 29.87 | 30 013 | 62.0 | 2 P | 24.0 | 6:30 A | 43.0 | 41.7 | 34.0 | 7.3 |
| 7 | 30.17 | 29 98 | 30.113 | 43.0 | 2 P | 30.0 | 12 P | 36.5 | 34.6 | 29.7 | 8.0 |
| 8 | 30.17 | 30.02 | 30.098 | 45 0 | 2 P | 23.0 | 5 A | 34.0 | 35.1 | 32.5 | 6.7 |
| 9 | 30.05 | 29.84 | 29.983 | 52.0 | 2:30 P | 30.5 | 7-30 A | 41.3 | 40.5 | 33.7 | 8.0 |
| 10 | 30.01 | 29.75 | 29.905 | 56.0 | 3 P | 30 5 | 7 A | 43.3 | 41.6 | 36.5 | 8.9 |
| 11 | 30.13 | 29 94 | 30.080 | 56.0 | 3 P | 24 0 | 7:30 A | 40.0 | 36.7 | 31.0 | 3.8 |
| 12 | 30.22 | 29.87 | 30.054 | 49.0 | 10 A | 24.0 | 12 P | 36.5 | 36.1 | 29.0 | 7.7 |
| 13 | 30.38 | 30.15 | 30.285 | 49.0 | 4:30 P | 18.5 | 6:30 A | 33.7 | 31.3 | 23.7 | 8.0 |
| 14 | 30.19 | 30.01 | 30.138 | 56 5 | 3:30 P | 22.5 | 7:30 A | 39.5 | 33.8 | 26.0 | 6.9 |
| 15 | 30.01 | 29.78 | 29.897 | 61.5 | 1:30 P | 23.5 | 2:30 A | 42.5 | 38.1 | 30.3 | 8.0 |
| 16 | 29.89 | 29.79 | 29.862 | 46.0 | 10 A | 29 0 | 12 P | 37.5 | 38.9 | 33.3 | 4.0 |
| 17 | 29.97 | 29.79 | 29.971 | 54.0 | 1:30 P | 22.0 | 7 A | 38.0 | 35.9 | 32.0 | 7.0 |
| 18 | 29.95 | 29.67 | 29.837 | 61.0 | 2:30 P | 27.5 | 6 A | 44.3 | 41.0 | 36.0 | 7.0 |
| 19 | 30.12 | 29.80 | 30.104 | 40.0 | 0 A | 25 0 | 9 P | 32.5 | 30.9 | 25.5 | 7.0 |
| 20 | 30.10 | 29.77 | 29.906 | 48.5 | 2:30 P | 28.0 | 7 A | 38.3 | 35.9 | 30.7 | 0.7 |
| 21 | 29.77 | 29.71 | 29.681 | 43.0 | 3 P | 35.5 | 7 A | 39.3 | 38.5 | 35.2 | 0.0 |
| 22 | 29.71 | 29.46 | 29.539 | 44.0 | 8 P | 37.0 | 9 A | 40.5 | 38.9 | 39.7 | 0.0 |
| 23 | 29.62 | 29.47 | 29.597 | 43.0 | 2:30 P | 33.0 | 7:30 A | 38.0 | 38.6 | 36.7 | 0.0 |
| 24 | 29 82 | 29.55 | 29.712 | 34.5 | 12 M | 18.0 | 0 A | 26.3 | 31.8 | 28.7 | 0.0 |
| 25 | 30.19 | 29.82 | 30.070 | 30.5 | 2 P | 17.5 | 8:30 A | 24.0 | 22.0 | 16.7 | 8.0 |
| 26 | 30.49 | 30.19 | 30 394 | 27.5 | 2 P | 13.0 | 12 P | 20.3 | 20.6 | 17.3 | 8.0 |
| 27 | 30.51 | 30 43 | 30.487 | 27.5 | 3:30 P | 10.5 | 7:30 A | 19.0 | 16.4 | 10.7 | 8.4 |
| 28 | 30.43 | 30.07 | 30.170 | 25.5 | 6 P | 12.0 | 12 P | 19.7 | 18.0 | 16.0 | 0.0 |
| 29 | 30.32 | 30.15 | 30.312 | 39.5 | 3 P | 7.0 | 7 A | 23.3 | 22.2 | 15.5 | 7.7 |
| 30 | 30.32 | 29.81 | 30.205 | 31.0 | 12 P | 11.5 | 7A | 21.3 | 23.6 | 22.3 | 1.3 |

# DAILY SUMMARY.

| Day. | Humidity. | | | Wind. | | | | | Precipitation. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Mean Dew Point. | Mean Force vapor. | Mean Relative Humidity. | Prevailing Direction. | Total Movement in Miles. | Maximum Pressure Per Square Ft | Miles per Hour. | Time. | Beginning. | Ending. | Total in Inches. | |
| | | | | | | | | | | | Rain.** | Snow. |
| 1 | 16.0 | .170 | 56.0 | W. | 19 | 0.0 | — | — | | | | |
| 2 | 23.0 | .175 | 72.0 | N.W. | 66 | 1.0 | 14 | 4 P | | | | |
| 3 | 26.0 | .186 | 79.5 | W. | 158 | 3.5 | 26 | 3 P | | | | |
| 4 | 20.5 | .205 | 54 0 | N. | 272 | 4.0 | 28 | 11 A | | | | |
| 5 | 26 5 | .211 | 70.0 | N. | 63 | 2.5 | 22 | 9 A | | | | |
| 6 | 26.5 | .244 | 62.0 | W.S.W. | 84 | 4.0 | 28 | 9 P | | | | |
| 7 | 24.0 | .180 | 73.0 | N. | 292 | 5.0 | 32 | 10 A | | | | |
| 8 | 27.0 | .212 | 69.0 | N.N.W. | 218 | 3.5 | 26 | 11 A | | | | |
| 9 | 28 0 | .220 | 69.5 | N.N.W. | 122 | 3.0 | 24 | 3 P | | | | |
| 10 | 31.0 | .252 | 68.5 | S.S.W. | 180 | 3.5 | 26 | 12 M | | | | |
| 11 | 26.5 | .140 | 79.5 | E. | 14 | 0.0 | — | — | | | | |
| 12 | 23.5 | .177 | 74.0 | N.W. | 131 | 2.5 | 22 | 3 P | | | | |
| 13 | 16.5 | .148 | 67.0 | W. | 12 | 0.0 | — | — | | | | |
| 14 | 17.0 | .162 | 64.5 | W. | 4 | 0.0 | — | — | | | | |
| 15 | 20.5 | .203 | 61.0 | W. | 46 | 1.5 | 17 | 6 P | | | | |
| 16 | 27.0 | .220 | 67.5 | N.N.W. | 256 | 4.0 | 28 | 1 P | | | | |
| 17 | 29.0 | .175 | 85.5 | N.W. | 85 | 1.5 | 17 | 1 P | | | | |
| 18 | 30.0 | .253 | 71.5 | S. | 60 | 4.0 | 28 | 6 A | | | | |
| 19 | 20.0 | .157 | 74.5 | N.W. | 278 | 2.0 | 20 | 9 A | | | | |
| 20 | 24.0 | .198 | 69.5 | S. | 163 | 2.5 | 22 | 2 P | | | | |
| 21 | 32.0 | .224 | 81.0 | S.E. | 30 | 0.0 | — | — | 10 P | 12 P | .05 | |
| 22 | 38.0 | .257 | 89 5 | E.S.E. | 60 | 0.5 | 10 | 9 A | 0 A | 12 P | .54 | |
| 23 | 35 0 | .227 | 91.5 | N.N.E. | 96 | 0.0 | — | — | 0 A | 3 P | .02 | |
| 24 | 24.0 | .174 | 77.0 | N.N.W. | 161 | 2.0 | 20 | 3 P | 7 A | 3 P | T | T |
| 25 | 9.5 | .105 | 67.5 | N.N.W. | 356 | 6.5 | 36 | 6 A | | | | |
| 26 | 9.5 | .109 | 64.5 | N.N.W. | 290 | 6.5 | 36 | 9 A | | | | |
| 27 | 2.5 | .080 | 63.5 | N. | 167 | 4.0 | 28 | 12 M | | | | |
| 28 | 10 0 | .100 | 73 0 | N.N.W. | 8 | 0.0 | — | — | 3:30A | 11:30A | .02 | ¾ |
| 29 | 3 5 | .107 | 53 0 | N. | 29 | 0.0 | — | — | | | | |
| 30 | 19.0 | .131 | 83.5 | N.N.W. | 1 | 0.0 | — | — | | | | |

**Rain or melted snow at base of tower. *Included in following day.

## REMARKS

The weather during November was characterized by the large amount of sunshine and small precipitation. During the first three weeks of the month not a trace of rain was noted and the remainder of the month had only one storm of any consequence. Notwithstanding the large amount of sunshine, the weather was considerably colder than usual and the last week was good winter weather. Some days showed unusually low mean temperatures for so early in the winter season.

The record of the several weather elements shows the following as the principal features: The mean barometer was higher than the normal and the range less than usual. The minimum pressure was considerably higher than the normal for this feature. During the last few days of the month a period of high pressure with considerable wind from the north points was concurrent with the low temperature. The total wind movement was, however, considerably less than normal and only two gales were noted.

The mean temperature was more than three degrees lower than usual, and the minimum for the month was more than six degrees below the normal for this feature, giving a comparatively large range.

The mean dew point and relative humidity were both several points below their normals. The total precipitation was only about one-fifth of the usual amount. A light fall of snow occurred near the end of the month. At the close of the month small ponds were frozen over and safe for skating.

J. E. OSTRANDER, Meteorologist.

T. H. REUMAN, Observer.

BULLETIN No. 348. DECEMBER, 1917

# Meteorological Observations
AT THE
# MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.
*Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.*
*Height of Wind Instruments 72 ft.*

## MONTHLY SUMMARY.

### **Pressure.** In inches.

| | |
|---|---|
| Maximum reduced to freezing | 30.53, 17th, 10 A |
| Minimum reduced to freezing | 28.89, 9th, 2 A |
| Reduced maximum reading | 30.86, 17th, 10 A |
| Reduced† minimum reading | 29.20, 9th, 2 A |
| Mean semi-daily reduced | 30.222 |
| Monthly range | 1.66 |

### ***Air Temperature.** In Degrees Fahr.

| | |
|---|---|
| Highest | 40 5, 5th, 3:30 P |
| Lowest | –22.5, 30th, 7:30 A |
| Mean hourly | 16.9 |
| Mean of means of max. and min. | 17.1 |
| Mean sensible (wet bulb) | 14.3 |
| Monthly range | 63.0 |
| Highest mean daily | 33.3, 1st |
| Lowest mean daily | –12.7, 30th |
| Mean maximum | 26.5 |
| Mean minimum | 7.7 |
| Mean daily range | 18.8 |
| Greatest daily range | 29.0, 22d |
| Least daily range | 5.0, 20th |

### **Humidity.**

| | |
|---|---|
| Mean dew point | 9.3 |
| Mean force of vapor | .104 |
| Mean relative humidity | 76.9 |

### **Precipitation.** In inches.

| | |
|---|---|
| Total precipitation, in inches | 2.56 |
| Total snow, in inches | 14¼ |
| Number of days on which .01 inch or more rain fell | 5 |
| Days of sleighing | 31 |

### **Wind.**

| | |
|---|---|
| Total movement | 4897 m |
| Greatest daily movement | 438m, 2d |
| Least daily movement | 5m, 16th |
| Mean daily movement | 158.0 m |
| Mean hourly velocity | 6.6 m |

Maximum pressure per square foot, 9.0 lbs = 43m per hour, 14th, 4 P, W.N.W.
Maximum velocity for 5 minutes 24m per hour, 14th, 4 P, W.N.W.
Prevailing direction, West Northwest.

Summary.

| | |
|---|---|
| North | 42 per cent |
| North Northwest | 13 " " |
| South Southwest | 13 " " |
| Northwest | 10 " " |
| West | 10 " " |
| Other directions | 12 " " |

### **Weather.**

| | |
|---|---|
| Mean cloudiness observed | 46 per cent |
| Total cloudiness recorded by the Sun Thermometer | 147 hours = 45 per cent |
| Number of clear days | 9 |
| Number of fair days | 10 |
| Number of cloudy days | 12 |

### **Bright Sunshine.**

Number hours recorded, 156 hrs, = 55 per cent.

**Rain.** 1st, 24th.

**Snow,** 1st, 8th, 10th, 13th, 14th, 28th.

**Gales,** 35 or more miles per hour. 35m, 2d, N.N.W.; 40m, 9th, W.N.W.; 36m, 10th, W.N.W.; 43m, 14th, W.N.W.

---

*Temperature in ground shelter.

**Reduced to freezing and sea-level.

# DAILY SUMMARY.

| Day. | Barometer Reduced to Sea Level. | | | Temperature. Ground Shelter. | | | | | | | No. Hours of Bright Sunshine |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Maximum | Minimum. | Mean. Semi-daily | Maximum | Time. | Minimum. | Time. | Mean of Max. and Min. | Mean Hourly Draper. | Mean Sensible Wet Bulb. | |
| 1 | 30.01 | 29.63 | 29.692 | 37.0 | 9 P | 29.0 | 10 A | 33.0 | 33.3 | 34.3 | 0.0 |
| 2 | 29.93 | 29.62 | 29.710 | 37.0 | 0 A | 23.0 | 12 P | 30.0 | 29.0 | 25.3 | 6.5 |
| 3 | 29.95 | 29.87 | 29.908 | 38.5 | 2:30 P | 18.5 | 7 A | 28.5 | 25.8 | 22.5 | 8.0 |
| 4 | 29.97 | 29.86 | 29.902 | 32.5 | 3 P | 17.0 | 7 A | 24.7 | 24.5 | 22.3 | 1.7 |
| 5 | 30.00 | 29.90 | 29.944 | 40.5 | 3:30 P | 18.0 | 5 A | 29.3 | 26.8 | 23.5 | 6.5 |
| 6 | 30.11 | 30.00 | 30.090 | 32.0 | 3 P | 18.0 | 12 P | 25.0 | 24.3 | 20.3 | 7.6 |
| 7 | 30.28 | 30.03 | 30.139 | 27.5 | 3 P | 10.5 | 12 P | 19.0 | 16.7 | 12.3 | 7.9 |
| 8 | 30.28 | 29.23 | 29.901 | 31.0 | 10:30 P | 2.5 | 7:30 P | 16.3 | 15.0 | 15.5 | 1.2 |
| 9 | 29.90 | 29.20 | 29.633 | 34.5 | 4 A | 11.5 | 8 P | 22.5 | 21.6 | 17.3 | 6.9 |
| 10 | 30.18 | 29.82 | 29.945 | 14.5 | 3:30 P | 5.5 | 7:30 P | 10.0 | 10.9 | 9.5 | 7.0 |
| 11 | 30.55 | 30.18 | 30.440 | 20.0 | 3 P | 2.5 | 2 A | 11.3 | 9.7 | 7.5 | 8.0 |
| 12 | 30.61 | 30.49 | 30.555 | 18.0 | 4 P | −1.5 | 7:30 A | 9.7 | 5.3 | 2.5 | 6.7 |
| 13 | 30.49 | 30.03 | 30.267 | 25.5 | 9 P | 1.0 | 0 A | 13.3 | 13.8 | 14.3 | 5.7 |
| 14 | 30.03 | 29.23 | 29.560 | 31.0 | 1 P | 17.0 | 12 P | 24.0 | 24.5 | 22.0 | 5.1 |
| 15 | 30.58 | 29.89 | 30.325 | 24.0 | 2 P | −2.0 | 12 P | 11.0 | 13.9 | 9.0 | 6.8 |
| 16 | 30.82 | 30.58 | 30.798 | 13.0 | 4 P | −13.0 | 7:30 A | 0.0 | 2.2 | −1.0 | 6.5 |
| 17 | 30.86 | 30.82 | 30.828 | 26.0 | 3 P | 8.0 | 10:30 P | 17.0 | 13.2 | 11.5 | 7.7 |
| 18 | 30.79 | 30.56 | 30.669 | 27.5 | 7 P | 9.0 | 0 A | 18.3 | 18.6 | 18.3 | 3.0 |
| 19 | 30.56 | 30.36 | 30.440 | 33.0 | 3 P | 23.0 | 6 A | 28.0 | 27.5 | 26.3 | 3.8 |
| 20 | 30.36 | 30.25 | 30.294 | 34.5 | 3:30 P | 29.5 | 0 A | 32.0 | 31.8 | 30.5 | 0.0 |
| 21 | 30.25 | 30.04 | 30.104 | 34.5 | 4 P | 28.0 | 7:30 P | 31.3 | 32.3 | 31.0 | 0.0 |
| 22 | 30.34 | 30.03 | 30.214 | 37.0 | 2 P | 8.0 | 12 P | 22.5 | 26.9 | 24.0 | 7.3 |
| 23 | 30.42 | 30.28 | 30.338 | 25.0 | 2:30 P | −2.0 | 7 A | 11.5 | 9.4 | 5.0 | 7.5 |
| 24 | 30.28 | 29.95 | 30.068 | 37.0 | 7:30 P | 13.0 | 0 A | 25.0 | 31.7 | 29.5 | 0.4 |
| 25 | 30.40 | 29.95 | 30.217 | 39.5 | 6 A | 20.0 | 12 P | 29.7 | 31.1 | 26.3 | 2.3 |
| 26 | 30.63 | 30.40 | 30.593 | 26.0 | 2:30 P | 2.5 | 12 P | 14.3 | 14.3 | 8.0 | 7.5 |
| 27 | 30.76 | 30.50 | 30.670 | 11.5 | 3 P | −6.5 | 7:30 A | 2.5 | 2.5 | −1.7 | 7.0 |
| 28 | 30.50 | 30.11 | 30.256 | 25.5 | 1:30 P | 1.0 | 0 A | 13.3 | 12.3 | 10.3 | 0.0 |
| 29 | 30.47 | 30.35 | 30.461 | 2.0 | 0 A | −14.5 | 12 P | −6.3 | −6.1 | −9.3 | 2.2 |
| 30 | 30.58 | 30.44 | 30.544 | 1.5 | 2:30 P | −22.5 | 7:30 A | −10.5 | −12.7 | −16.5 | 8.2 |
| 31 | 30.46 | 30.27 | 30.370 | 5.0 | 3:30 P | −15.5 | 7:30 A | −5.3 | −6.9 | −9.3 | 7.2 |

# DAILY SUMMARY.

| Day. | Humidity. | | | Wind. | | | | | Precipitation. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Total in Inches. | |
| | Mean Dew Point. | Mean Force vapor. | Mean Relative Humidity. | Prevailing Direction. | Total Movement in Miles. | Maximum Pressure . Per Square Ft | Miles per Hour. | Time. | Beginning. | Ending. | Rain.** | Snow. |
| 1 | 31.0 | .199 | 86.5 | N N.W. | 112 | 3.0 | 24 | 9 P | 0 A | 5 P | 1.10 | 2¼ |
| 2 | 21.0 | .148 | 80.0 | N.N.W. | 438 | 6.0 | 35 | 6 P | | | | |
| 3 | 19.5 | .129 | 83 5 | N. | 152 | 3.0 | 24 | 8 A | | | | |
| 4 | 17.5 | .132 | 77 5 | N.N.W. | 18 | 0 5 | 10 | 1 P | | | | |
| 5 | 20 0 | .140 | 80.5 | S.S.W. | 29 | 0 0 | — | — | | | | |
| 6 | 16.0 | .120 | 76.5 | N. | 62 | 2 5 | 22 | 12 P | | | | |
| 7 | 6.0 | .084 | 71.5 | N.N.E. | 203 | 3.0 | 24 | 9 A | | | | |
| 8 | 8 5 | .105 | 73.5 | N. | 62 | 5.5 | 33 | 7 P | 3:30 P | 11:30 P | .28 | 3¼ |
| 9 | 13 0 | .108 | 78.5 | W. | 295 | 8 0 | 40 | 8 A | | | | |
| 10 | 7.5 | .072 | 90.5 | W.N W. | 261 | 6.5 | 36 | 1 P | 5 P | 6 P | T | T |
| 11 | 1.5 | .067 | 72.5 | W. | 148 | 5 0 | 32 | 11 A | | | | |
| 12 | 3.0 | .053 | 80.0 | N. | 8 | 0.0 | — | — | | | | |
| 13 | 11 5 | .095 | 86.5 | N. | 26 | 2.5 | 22 | 11 P | 5 A | 12 P | .38 | 2 |
| 14 | 19 5 | .124 | 86.5 | N W. | 337 | 9 0 | 43 | 4 P | 0 A | 7:30A | .75 | 6 |
| 15 | 5 0 | .073 | 79.5 | N.W. | 247 | 5 0 | 32 | 9 A | | | | |
| 16 | −7.0 | .050 | 72 5 | N. | 5 | 1 0 | 14 | 11 P | | | | |
| 17 | 7.0 | 078 | 80.0 | N. | 120 | 4.0 | 28 | 2 P | | | | |
| 18 | 14.5 | .108 | 83.0 | N. | 183 | 1.5 | 17 | 10 P | | | | |
| 19 | 23.0 | .150 | 86.0 | N.N.E. | 30 | 1.0 | 14 | 10 P | | | | |
| 20 | 28.0 | .178 | 87.0 | S.S.W. | 86 | 1.0 | 14 | 11 A | | | | |
| 21 | 29 5 | .176 | 95.0 | S.S.W. | 70 | 0.0 | — | — | | | | |
| 22 | 17.5 | .149 | 70.5 | N. | 198 | 2 5 | 22 | 11 A | | | | |
| 23 | −5 0 | .062 | 62.5 | S S.W. | 16 | 0.0 | — | — | | | | |
| 24 | 27.5 | .176 | 82 0 | S. | 185 | 4.0 | 28 | 2 P | 11 A | 8 P | T | |
| 25 | 19.5 | .167 | 66.5 | N.W. | 260 | 3 5 | 26 | 8 A | | | | |
| 26 | −1.5 | .071 | 60.5 | N. | 145 | 2.5 | 22 | 1 P | | | | |
| 27 | −8.5 | .044 | 69 0 | N.N.W. | 85 | 2 0 | 20 | 1 A | | | | |
| 28 | 4 5 | .077 | 76 0 | W. | 129 | 5.0 | 32 | 3 P | 7 A | 2 P | .05 | ¾ |
| 29 | −18 5 | .031 | 59 0 | N. | 341 | 4 5 | 30 | 3 A | | | | |
| 30 | −26.0 | .019 | 63 0 | N. | 283 | 4.5 | 30 | 12 M | | | | |
| 31 | −16.5 | .031 | 67.0 | N. | 363 | 5.0 | 32 | 12 M | | | | |

**Rain or melted snow at base of tower. *Included in following day.

# Annual Summary for 1917.

### **Pressure.** In inches.

| | |
|---|---|
| Maximum reduced to freezing, | 30.53, Dec. 17th, 10 A. |
| Minimum reduced to freezing. | 28.61. Feb. 5th, 11 A. |
| Maximum reduced to freezing and sea-level, | 30.86, Dec. 17th, 10A. |
| Minimum reduced to freezing and sea-level, | 28.93, Feb. 5th, 11 A. |
| Mean reduced to freezing and sea-level, | 30.010 |
| Annual range, | 1.93 |

### ***Air Temperature.** In degrees Fahr.

| | |
|---|---|
| Highest, | 98.5, July 31st, 5 P. |
| Lowest, | —22.5, Dec. 30th, 7:30 A. |
| Mean hourly, | 44.4 |
| Mean of means of max. and min., | 44.8 |
| Mean sensible (wet bulb), | 40.2 |
| Annual range, | 121.0 |
| Highest mean daily, | 86.4, July 31 |
| Lowest mean daily, | —12.7, Dec. 30 |
| Mean maximum, | 55.2 |
| Mean minimum, | 34.6 |
| Mean daily range, | 20.6 |
| Greatest daily range, | 43.0, Mar. 7 |
| Least daily range, | 3.0, Jan. 5 |

### **Humidity.**

| | |
|---|---|
| Mean dew point, | 36.4 |
| Mean force of vapor, | .352 |
| Mean relative humidity, | 78.1 |

### **Wind.**

| | |
|---|---|
| Prevailing direction, | West. |

Summary.

| | |
|---|---|
| Total movement, | 44,653 m |
| Greatest daily movement, | 611m., April 11 |
| Least daily movement, | 1 m., Sept. 26; Nov. 30 |
| Mean daily movement, | 122 m |
| Mean hourly velocity, | 5.1 m |

Maximum pressure per square foot, 35.0 lbs.=84 m. per hour, April 10, 3 P., N.W.

Maximum velocity for 5 minutes, 40 m. per hour, Apr. 10th, 3 P., N.W.

| | |
|---|---|
| North Northwest, | 10 per cent |
| West Northwest | 10 " " |
| West, | 10 " " |
| Northwest | 10 " " |
| Other directions, | 59 " " |

### **Precipitation.** In inches.

| | |
|---|---|
| Total precipitation, rain or melted snow, | 43.56 |
| Number of days on which .01 or more rain or melted snow fell, | 117 |
| Snow total in inches, | 58.0 |

### **Weather.**

| | |
|---|---|
| Mean cloudiness observed, | 48 per cent. |
| Total cloudiness recorded by Sun Thermometer, | 1770 hrs.=40 per cent. |
| Number of clear days, | 129 |
| Number of fair days, | 137 |
| Number of cloudy days, | 99 |

### **Bright Sunshine.**

Number of hours recorded, 2684 hrs.=60 per cent.

### **Dates of Frosts.**

| | |
|---|---|
| Last, | May 18th |
| First, | Sept. 11th |

### **Dates of Snow.**

| | |
|---|---|
| Last, | April 27th |
| First, | Nov. 24th |
| Total days of sleighing, | 95 |

### **Gales of 50 or More Miles Per Hour.**

Jan. 14th, 57m., S.S.W.; Feb. 5th. 55m., S.W.: Feb. 10th, 52m, N.W.; April 10th, 84m., N.W.; Oct. 24th, 51m., S.: 30th, 58m, S.W.

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* Temperature in ground shelter.

J. E. OSTRANDER,
*Meteorologist.*

A. L. CHANDLER,
*Observer.*

BULLETIN No. 349. JANUARY, 1918

# Meteorological Observations
AT THE
# MASSACHUSETTS
# AGRICULTURAL EXPERIMENT
# STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.
*Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.*
*Height of Wind Instruments 72 ft.*

## MONTHLY SUMMARY.

### **Pressure.** In inches.

| | |
|---|---|
| Maximum reduced to freezing, | 30.20, 28th, 6 A |
| Minimum reduced to freezing, | 28.52, 15th, 1 P |
| Reduced maximum reading | 30.54, 28th, 6 A |
| Reduced† minimum reading, | 28.84, 15th, 1 P |
| Mean semi-daily reduced | 29.875 |
| Monthly range | 1.70 |

### ***Air Temperature.** In Degrees Fahr.

| | |
|---|---|
| Highest | 44.0, 12th, 2:30 P |
| Lowest | −20.0, 2nd, 7:30 A |
| Mean hourly | 13.3 |
| Mean of means of max. and min. | 13.9 |
| Mean sensible (wet bulb) | 10.9 |
| Monthly range | 64.0 |
| Highest mean daily | 33.7, 12th |
| Lowest mean daily | −6.4, 2nd |
| Mean maximum | 22.9 |
| Mean minimum | 4.9 |
| Mean daily range | 18.0 |
| Greatest daily range | 33.0, 31st |
| Least daily range | 6.0, 13th |

### **Humidity.**

| | |
|---|---|
| Mean dew point | 5.9 |
| Mean force of vapor | .084 |
| Mean relative humidity | 77.1 |

### **Precipitation.** In inches.

| | |
|---|---|
| Total precipitation, in inches | 4.11 |
| Total snow, in inches | 18½ |
| Number of days on which .01 inch or more rain fell | 11 |
| Days of sleighing, | 31 |

### **Wind.**

| | |
|---|---|
| Total movement | 5491 m |
| Greatest daily movement | 391 m, 4th |
| Least daily movement | 11 m, 18th |
| Mean daily movement | 177 m |
| Mean hourly velocity | 7.4 m |

Maximum pressure per square foot, 8.5 lbs = 41m per hour, 11th, 2 A, N.W.

Maximum velocity for 5 minutes, 32m per hour, 11th, 2 A, N.W.

Prevailing direction, West Northwest.

### Summary.

| | |
|---|---|
| North | 16 per cent |
| North Northwest | 13 " " |
| Northwest | 22 " " |
| West Northwest | 10 " " |
| West Southwest | 16 " " |
| West | 10 " " |
| Other directions | 13 " " |

### **Weather.**

| | |
|---|---|
| Mean cloudiness observed | 44 per cent |
| Total cloudiness recorded by the Sun Thermometer | 121 hours = 41 per cent |
| Number of clear days | 9 |
| Number of fair days | 14 |
| Number of cloudy days | 8 |

### **Bright Sunshine.**

Number hours recorded, 173 hrs, = 59 per cent.

**Rain,** 7th, 12th.

**Snow,** 7th, 8th, 10th, 11th, 12th, 15th, 17th, 18th, 19th, 22d, 24th, 25th, 28th, 29th.

**Hail,** 7th, 28th.

**Gales,** 40m 3d, N; 36m 5th, N.W.; 36m 10th, N.W.; 41m 11th, N.W.; 39m 12th, W.S.W.; 36m 15th, N.W.; 40m 20th, W.N.W.; 35m 23d, W.N.W.

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*Temperature in ground shelter.
**Reduced to freezing and sea-level.

# DAILY SUMMARY.

| Day. | Barometer Reduced to Sea Level. | | | Temperature. Ground Shelter. | | | | | | | No. Hours of Bright Sunshine |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Maximum | Minimum. | Mean. Semi-daily | Maximum | Time. | Minimum. | Time. | Mean of Max. and Min. | Mean Hourly Draper. | Mean Sensible Wet Bulb. | |
| 1 | 30.28 | 29 97 | 30.067 | 10.0 | 4 P | −11.0 | 12 P | −0.5 | −4.3 | −7.5 | 7.8 |
| 2 | 30.14 | 30.01 | 30.097 | 5.0 | 4 P | −20.0 | 7:30 A | −7.5 | −6.4 | −10.3 | 6.5 |
| 3 | 30.14 | 29.94 | 30.039 | 9.0 | 4 P | −10.0 | 6 A | −0.5 | −1.0 | −2.3 | 4.3 |
| 4 | 29 94 | 29.66 | 29.747 | 13.5 | 3 P | −2.0 | 1 A | 5.7 | 5.0 | 1.3 | 8.3 |
| 5 | 29.72 | 29.62 | 29.631 | 23.5 | 3 P | 14.0 | 12 P | 18.7 | 14.9 | 12.5 | 8.3 |
| 6 | 29.96 | 29.72 | 29 910 | 31.5 | 3 P | 11.0 | 4 A | 21.3 | 18.3 | 13 5 | 8.2 |
| 7 | 29 95 | 29.45 | 29.602 | 31.5 | 1 P | 13.0 | 0 A | 22.3 | 26 0 | 27.0 | 0.0 |
| 8 | 29.55 | 29.42 | 29.435 | 30.0 | 2 A | 20.0 | 12 P | 25.0 | 25.9 | 23 5 | 1.1 |
| 9 | 29.56 | 29 45 | 29.485 | 27.0 | 1:30 P | 17.0 | 4:30 A | 22.0 | 21.9 | 19.5 | 4.8 |
| 10 | 29.66 | 29.45 | 29.546 | 28.0 | 0:30 P | 16.0 | 7 A | 22.0 | 22.0 | 19.0 | 4.6 |
| 11 | 29.90 | 29.66 | 29.862 | 36.0 | 2 P | 20.0 | 7:30 A | 28.0 | 26.4 | 20.7 | 8.0 |
| 12 | 29.82 | 29 14 | 29.283 | 44.0 | 2:30 P | 19 0 | 12 P | 31.5 | 33.7 | 31.0 | 3.8 |
| 13 | 29.94 | 29.45 | 29.753 | 10.0 | 4:30 P | 4.0 | 12 P | 7.0 | 7.9 | 4.7 | 7.0 |
| 14 | 29.99 | 29 89 | 29.957 | 25 5 | 4 P | 4.0 | 0 A | 14.7 | 14.5 | 11.5 | 5.7 |
| 15 | 29.89 | 28 84 | 29.309 | 27.5 | 5 P | 14.5 | 5 A | 21.0 | 19.8 | 18.7 | 0.5 |
| 16 | 29 96 | 29.49 | 29 828 | 32.0 | 4 P | 11.0 | 12 P | 21.5 | 19.9 | 13.7 | 8.5 |
| 17 | 29.98 | 29.82 | 29 891 | 20.0 | 4:30 P | 3.5 | 2:30 A | 11.7 | 12.2 | 12.3 | 1.0 |
| 18 | 30.01 | 29 83 | 29 927 | 22.0 | 3:30 P | 3.5 | 7:30 A | 12.7 | 11.1 | 16 5 | 6.6 |
| 19 | 30.03 | 29 81 | 29.874 | 26.5 | 1 P | 1.0 | 12 P | 13.7 | 15.9 | 12 5 | 4.9 |
| 20 | 30.12 | 29 94 | 30 107 | 15.5 | 3:30 P | -6.5 | 7 A | 4 5 | 6 0 | 2.3 | 7.1 |
| 21 | 30.26 | 30.11 | 30.177 | 27.5 | 3 P | 3.5 | 5 A | 15 5 | 14.0 | 9.7 | 8.4 |
| 22 | 30.20 | 29.61 | 29.820 | 15 5 | 4 P | 0.5 | 3:30 A | 8.0 | 7.8 | 8.7 | 0.0 |
| 23 | 29.87 | 29.61 | 29.738 | 21.0 | 2 P | 1.5 | 4 A | 11.3 | 11.2 | 7.7 | 8.6 |
| 24 | 29.87 | 29.71 | 29 799 | 22.0 | 2:30 P | 4 0 | 2:30 A | 13 0 | 12 2 | 8.5 | 7.7 |
| 25 | 29.74 | 29 61 | 29.676 | 25.5 | 4:30 P | 11.5 | 4:30 A | 18.5 | 16.0 | 14.2 | 5.0 |
| 26 | 30.22 | 29 74 | 30.068 | 29 5 | 4:30 P | 11 0 | 12 P | 20.3 | 16 4 | 14.3 | 8.0 |
| 27 | 30.44 | 30.19 | 30 363 | 19.0 | 3 P | 1.5 | 6 A | 10 3 | 6.8 | 2.7 | 8.0 |
| 28 | 30 54 | 30.15 | 30.383 | 9.0 | 8:30 P | −2.5 | 7 A | 3.3 | 2.8 | 2.0 | 0.6 |
| 29 | 30 28 | 30 03 | 30.131 | 29 5 | 3:30 P | 7.0 | 0 A | 18.3 | 14.8 | 12.0 | 7 6 |
| 30 | 30.45 | 30.27 | 30.384 | 20.0 | 2 P | 0 0 | 12 P | 10.0 | 10.6 | 7 0 | 6 2 |
| 31 | 30.35 | 30.19 | 30.259 | 25.5 | 3 P | −7.5 | 3:30 A | 9.0 | 9.3 | 10.0 | 6 0 |

# DAILY SUMMARY.

| Day. | Humidity. | | | Wind. | | | | | Precipitation. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Mean Dew Point. | Mean Force vapor. | Mean Relative Humidity. | Prevailing Direction. | Total Movement in Miles. | Maximum Pressure Per Square Ft | Miles per Hour. | Time. | Beginning. | Ending. | Total in Inches. Rain.** | Total in Inches. Snow. |
| 1 | -10.5 | .033 | 84.0 | N. | 144 | 2.5 | 22 | 6 A | | | | |
| 2 | -14.0 | .031 | 81.0 | W.S.W. | 22 | 0.0 | — | — | | | | |
| 3 | -6.0 | .043 | 79.5 | N.N.E. | 246 | 8.0 | 40 | 9 P | | | | |
| 4 | -1.0 | .050 | 88.5 | N. | 391 | 5.5 | 33 | 1 P | | | | |
| 5 | 6 0 | .089 | 68.5 | N. | 326 | 6.5 | 36 | 3 P | | | | |
| 6 | 8.0 | .089 | 74 0 | N.N.W. | 168 | 2.0 | 20 | 12 M | | | | |
| 7 | 24.0 | .155 | 86.0 | N.N.W. | 90 | 0.5 | 10 | 2 P | 7 A | 2 P | .70 | ¾ |
| 8 | 18.5 | .139 | 75.5 | N. | 150 | 2.5 | 22 | 6 P | 6 A | 7 A | T | T |
| 9 | 13.0 | .118 | 69.5 | N.W. | 231 | 5.0 | 32 | 1 P | | | | |
| 10 | 12.0 | .117 | 69.5 | N.W. | 347 | 6.5 | 36 | 12 M | 9:30A | 4 P | T | T |
| 11 | 13.5 | .126 | 68.0 | W.N.W. | 202 | 8.5 | 41 | 2 A | 11:30P | 12 P | 10 | 1 |
| 12 | 25.5 | .197 | 73.0 | S.S.W. | 282 | 7.5 | 39 | 9 P | 0 A | 8:30A | 1.65 | 1 |
| 13 | -1.5 | .058 | 67.5 | W.S.W. | 357 | 3.0 | 24 | 3 A | | | | |
| 14 | 3 5 | .088 | 60.0 | W.S.W. | 212 | 2.5 | 22 | 2 P | | | | |
| 15 | 16.0 | .110 | 83.5 | N.W. | 184 | 6.5 | 36 | 6 P | 1:30A | 3 P | 1.06 | 6¼ |
| 16 | 7.5 | .091 | 70.5 | W. | 284 | 4.0 | 28 | 1 A | | | | |
| 17 | 11 0 | .081 | 91.0 | W. | 43 | 0.0 | — | — | 6 A | 1 P | .07 | ¾ |
| 18 | 7.5 | .076 | 87.0 | N.W. | 11 | 0.0 | — | — | 10:30P | 12 P | .05 | 1 |
| 19 | 8.5 | .085 | 80.5 | W.N.W. | 89 | 1.0 | 14 | 3 P | 0 A | 5:30A | .12 | 2 |
| 20 | -1.5 | .054 | 81.0 | W.S.W. | 198 | 8.0 | 40 | 12 M | | | | |
| 21 | 2.5 | .075 | 64 0 | W.N.W. | 170 | 2.5 | 22 | 12 M | | | | |
| 22 | 4.5 | .066 | 85.0 | N.N.W. | 47 | 0.5 | 10 | 10 P | 10 A | 6 P | .18 | 3½ |
| 23 | 0.5 | .068 | 72.0 | W.S.W. | 208 | 6 0 | 35 | 3 P | | | | |
| 24 | 4.5 | .070 | 79.5 | S.S.W. | 128 | 2.0 | 20 | 3 P | 4:30P | 9 P | T | T |
| 25 | 12 5 | .088 | 93 0 | W. | 29 | 0.0 | — | — | 3 A | 11 A | .03 | ½ |
| 26 | 8 0 | .093 | 70 0 | N.W. | 246 | 5.0 | 32 | 6 A | | | | |
| 27 | -3.5 | 054 | 70 5 | N. | 229 | 4.0 | 28 | 5 A | | | | |
| 28 | -2.0 | .052 | 80.0 | N.N.W. | 215 | 3.5 | 26 | 6 A | 2:30P | 12 P | 0.10 | 1 |
| 29 | 6.0 | .085 | 71.5 | N.W. | 144 | 3.0 | 24 | 7 P | 0 A | 5 A | .05 | ¾ |
| 30 | 4 5 | .064 | 86 5 | N.W. | 72 | 0.0 | — | — | | | | |
| 31 | 5.5 | .073 | 80.0 | S.W. | 26 | 0.0 | — | — | | | | |

**Rain or melted snow at base of tower.

*Included in following day.

# REMARKS

The predominating feature of the weather for the month was the extreme cold which prevailed with practically no cessation during the entire period. The month opened with the first three days averaging below zero for each day, and taken with the last three days of December when the same conditions prevailed, gave a period of six consecutive days when the mean hourly temperature was below zero—an unprecedented record for this locality. Just as the preceding month was the coldest December on our records, so the month just closed proved to be the coldest January of which we have any record at this station. In fact it was the coldest month of which there is any authentic record for Amherst, dating back to 1836.

There was but one day during the month when the mean temperature was above freezing, and since the last of November there have been but three days with a mean hourly temperature above 32 degrees. While the minimum temperature for January was not quite so low as the December minimum, the mean temperature for January was about three and one-half degrees lower than the December mean. The usual January thaw did not put in an appearance. The month closed with zero weather on the last day.

The mean barometer was extremely low in contrast with the unusually high record for December. The range of pressure was much greater than usual, due to the very low record made near the middle of the month. The total wind movement was considerably more than the normal and nearly the whole time was from the Northwest quadrant.

The total precipitation was about one-half inch more than normal and the snowfall of more than eighteen inches was much greater than usual.

The mean dew point was extremely low, due to the low temperature which prevailed. The mean relative humidity was about the only normal feature for the month.

The hours of bright sunshine recorded were considerably more than usual.

J. E. OSTRANDER, Meteorologist.
A. L. CHANDLER, Observer.

**BULLETIN No. 350. FEBRUARY, 1918**

# Meteorological Observations
AT THE
# MASSACHUSETTS
# AGRICULTURAL EXPERIMENT
# STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.
*Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.*
*Height of Wind Instruments 72 ft.*

## MONTHLY SUMMARY.

**Pressure.** In inches.

| | |
|---|---|
| Maximum reduced to freezing | 30.37, 21st, 12 P |
| Minimum reduced to freezing | 28.58, 26th, 6 A |
| Reduced maximum reading | 30.70, 21st, 12 P |
| Reduced† minimum reading | 28.88, 26th, 6 A |
| Mean semi-daily reduced | 30.063 |
| Monthly range | 1.82 |

***Air Temperature.** In Degrees Fahr.

| | |
|---|---|
| Highest | 51.0, 25th, 3 P |
| Lowest | -22.5, 2nd, 6 A |
| Mean hourly | 20.5 |
| Mean of means of max. and min. | 19.6 |
| Mean sensible (wet bulb) | 18.0 |
| Monthly range | 73.5 |
| Highest mean daily | 42.3, 25th |
| Lowest mean daily | -9.1, 5th |
| Mean maximum | 31.4 |
| Mean minimum | 7.7 |
| Mean daily range | 23.7 |
| Greatest daily range | 43.5, 2d |
| Least daily range | 4.5, 28th |

**Humidity.**

| | |
|---|---|
| Mean dew point | 12.8 |
| Mean force of vapor | .126 |
| Mean relative humidity | 76.0 |

**Precipitation.** In inches.

| | |
|---|---|
| Total precipitation, in inches | 2 99 |
| Total snow, in inches | 11 |
| Number of days on which .01 inch or more rain fell | 11 |
| Days of sleighing, | 28 |

**Wind.**

| | |
|---|---|
| Total movement | 5632 m |
| Greatest daily movement | 483m, 26th |
| Least daily movement | 25m, 3d |
| Mean daily movement | 201 m |
| Mean hourly velocity | 8.4 m |

Maximum pressure per square foot, 20.0 lbs = 63m per hour, 26th, 3 P, W.N.W.

Maximum velocity for 5 minutes, 45m per hour, 26th, , 1 P, W.N.W.

Prevailing direction, West.

Summary.

| | |
|---|---|
| South Southwest | 25 per cent |
| West Northwest | 14 " " |
| North Northwest | 14 " " |
| Northwest | 11 " " |
| West | 11 " " |
| Southwest | 11 " " |
| Other directions | 14 " " |

**Weather.**

| | |
|---|---|
| Mean cloudiness observed | 45 per cent |
| Total cloudiness recorded by the Sun Thermometer | 142 hours = 48 per cent |
| Number of clear days | 9 |
| Number of fair days | 9 |
| Number of cloudy days | 10 |

**Bright Sunshine.**

Number hours recorded, 154 hrs, = 52 per cent

**Rain,** 15th, 19th, 25th, 26th, 28th.

**Snow,** 3d, 6th, 9th, 10th, 17th, 22d, 28th.

**Hail,** 9th, 28th.

**Gales,** 57m, 4th, W.NW.; 46m 5th, W.N.W.; 42m, 14th, S.S.W.; 39m, 15th, N.W.; 39m, 19th, S.W.; 57m, 20th, N.W.; 44m, 21st, S.S.W.; 53m, 25th, S.W.; 63m, 26th, W.N.W.

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*Temperature in ground shelter.

**Reduced to freezing and sea-level.

# DAILY SUMMARY.

| Day. | Barometer Reduced to Sea Level. |  |  | Temperature. Ground Shelter. |  |  |  |  |  |  | No. Hours of Bright Sunshine |
|---|---|---|---|---|---|---|---|---|---|---|---|
|  | Maximum | Minimum. | Mean. Semi-daily | Maximum | Time. | Minimum. | Time. | Mean of Max. and Min. | Mean Hourly Draper. | Mean Sensible Wet Bulb. |  |
| 1 | 30.38 | 30.22 | 30.312 | 19.0 | 2 P | −8.0 | 12 P | 5.5 | 9.3 | 5.5 | 8.5 |
| 2 | 30.34 | 30.16 | 30.281 | 21.0 | 3 P | −22.5 | 6 A | −0.7 | −0.3 | −2.0 | 8.5 |
| 3 | 30.22 | 29.63 | 29 897 | 13 5 | 12 P | −11.0 | 6 A | 1.3 | 3.1 | 3.7 | 0.3 |
| 4 | 29 90 | 29.61 | 29.776 | 23 0 | 3:30 A | −7.5 | 12 P | 7.7 | 8.1 | 4.7 | 8.8 |
| 5 | 30.40 | 29.90 | 30.258 | −1.0 | 3:30 P | −14.5 | 7:30 A | −7.7 | −9.1 | −12.0 | 8.4 |
| 6 | 30.39 | 29.97 | 30.120 | 26.0 | 12 P | −10 0 | 0 A | 8.0 | 10 6 | 12.2 | 0.5 |
| 7 | 30.19 | 29 96 | 30.053 | 40.0 | 3:30 P | 26.0 | 0 A | 33 0 | 30.9 | 28.0 | 4.6 |
| 8 | 30.51 | 30.19 | 30.436 | 28.0 | 4:30 P | 2.5 | 12 P | 15.3 | 17.5 | 12.7 | 8.8 |
| 9 | 30.51 | 29.81 | 30.053 | 36.5 | 8:30 P | −3.5 | 4 A | 16.5 | 16.3 | 17.5 | 0.0 |
| 10 | 29.97 | 29 83 | 29.903 | 30.0 | 1:30 P | 16.0 | 7:30 A | 23.0 | 22.1 | 19 5 | 4.9 |
| 11 | 30.11 | 29 83 | 29.961 | 35.0 | 3:30 P | 7 0 | 7:30 A | 21.0 | 24 5 | 21.7 | 8.8 |
| 12 | 29.83 | 29.44 | 29.615 | 43.0 | 4:30 P | 26.0 | 7 A | 34.5 | 34.5 | 31.7 | 3.5 |
| 13 | 30.18 | 29 43 | 29.928 | 49.0 | 2 A | 23.5 | 12 P | 36.3 | 37.5 | 31.0 | 6.1 |
| 14 | 30.37 | 29 86 | 30 217 | 39 5 | 3 P | 16 0 | 7 A | 27.7 | 29.3 | 25 2 | 0.9 |
| 15 | 30.17 | 29.52 | 29.725 | 48 5 | 0:30 P | 20.5 | 12 P | 34 5 | 36 5 | 37.7 | 0.0 |
| 16 | 30.36 | 30.14 | 30 306 | 24.5 | 4 P | 16.0 | 8 A | 20.3 | 19.5 | 16.0 | 7.3 |
| 17 | 30.50 | 30.05 | 30.238 | 25.0 | 3:30 P | 8.5 | 12 P | 16.7 | 17.2 | 13 7 | 9.7 |
| 18 | 30.65 | 30.50 | 30.590 | 30.0 | 5 P | 0.0 | 7:30 A | 15.0 | 16.1 | 11.7 | 9.7 |
| 19 | 30 53 | 29 74 | 30.080 | 40.0 | 12 P | 19.0 | 2 A | 29 5 | 31.5 | 33.3 | 0.0 |
| 20 | 30.33 | 29.53 | 29.870 | 47.0 | 9 A | 10.0 | 12 P | 28.5 | 32 2 | 28.7 | 7.2 |
| 21 | 30.70 | 30.33 | 30.610 | 10.0 | 0 A | 2.0 | 12 P | 6.0 | 4.8 | 1.3 | 8.1 |
| 22 | 30.70 | 30.12 | 30 398 | 12.0 | 5 P | −7.0 | 7 A | 2.5 | 5.3 | 2.3 | 4.5 |
| 23 | 30.14 | 29.81 | 29.940 | 29.0 | 4:30 P | −10 0 | 7 A | 9 5 | 14.0 | 11 7 | 7.7 |
| 24 | 29.81 | 29.55 | 29 657 | 43.0 | 5:30 P | 14.0 | 6 A | 28.5 | 28.4 | 25.5 | 1.3 |
| 25 | 29 86 | 29.51 | 29.737 | 51.0 | 3 P | 32.0 | 1:30 A | 41.5 | 42.3 | 37 0 | 8.4 |
| 26 | 29.83 | 28 88 | 29 406 | 45 0 | 5:30 A | 22 0 | 12 P | 33.5 | 31.4 | 29.3 | 8:1 |
| 27 | 30.19 | 29 83 | 30.138 | 38.0 | 5 P | 19 5 | 7:30 A | 28 7 | 28.5 | 25 0 | 9 7 |
| 28 | 30.29 | 30.19 | 30.271 | 35.0 | 12 M | 30.5 | 7 A | 32.7 | 32.6 | 31.7 | 0.0 |

# DAILY SUMMARY.

| Day. | Humidity. | | | Wind. | | | | | Precipitation. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Mean Dew Point. | Mean Force vapor. | Mean Relative Humidity. | Prevailing Direction. | Total Movement in Miles. | Maximum Pressure Per Square Ft | Miles per Hour. | Time. | Beginning. | Ending. | Total in Inches. | |
| | | | | | | | | | | | Rain.** | Snow. |
| 1 | −1.5 | .064 | 68.0 | N.W. | 137 | 4.5 | 30 | 9 A | | | | |
| 2 | −9.0 | .050 | 65.5 | W.N.W. | 53 | 6.5 | 10 | 3 A | | | | |
| 3 | 0.0 | .059 | 80.5 | W. | 25 | 0.0 | — | — | 7:30A | 7:30P | .12 | $1\frac{3}{4}$ |
| 4 | −3.0 | .062 | 66.5 | W.N.W. | 316 | 16.0 | 57 | 4 A | | | | |
| 5 | −17.0 | .027 | 72.5 | N.N.W. | 312 | 10.5 | 46 | 10 A | | | | |
| 6 | 5.0 | .092 | 72.0 | S.S.W. | 193 | 5.5 | 33 | 8 A | 11:30A | 9 P | .15 | 3 |
| 7 | 24.0 | .164 | 82.0 | N.W. | 84 | 1.5 | 17 | 7 A | | | | |
| 8 | 5.0 | .088 | 66.0 | N.N.E. | 167 | 5.0 | 32 | 8 A | | | | |
| 9 | 14.0 | .135 | 82.5 | W.N.W. | 108 | 2.0 | 20 | 11 P | 3 A | 5 P | .44 | 2 |
| 10 | 16.0 | .112 | 84.5 | S.W. | 95 | 0.5 | 10 | 2 P | 2:30P | 4:30P | .02 | $\frac{1}{4}$ |
| 11 | 18.5 | .131 | 85.0 | S.S.W. | 163 | 4.5 | 30 | 2 P | | | | |
| 12 | 28.0 | .199 | 83.0 | S.S.W. | 146 | 2.5 | 22 | 7 P | | | | |
| 13 | 26.5 | .190 | 78.5 | N.W. | 238 | 4.5 | 30 | 4 A | | | | |
| 14 | 20.5 | .161 | 80.0 | S.S.W. | 91 | 9.0 | 42 | 8 P | | | | |
| 15 | 31.5 | .210 | 87.0 | W.S.W. | 232 | 7.5 | 39 | 7 P | 2 A | 4:30A | .08 | |
| 16 | 8.0 | .104 | 63.5 | N. | 196 | 3.5 | 26 | 6 A | | | | |
| 17 | 9.0 | .089 | 74.5 | N.W. | 193 | 4.5 | 30 | 11 A | 3 A | 4:30A | .07 | $\frac{3}{4}$ |
| 18 | 7.0 | .090 | 74.5 | S.W. | 96 | 1.5 | 17 | 3 P | | | | |
| 19 | 32.0 | .199 | 92.5 | S.S.W. | 380 | 7.5 | 39 | 12 M | 11:30A | 11 P | .65 | |
| 20 | 25.5 | .198 | 79.5 | W. | 431 | 16.0 | 57 | 8 P | | | | |
| 21 | −7.5 | .051 | 61.0 | N.W. | 415 | 9.5 | 44 | 2 P | | | | |
| 22 | −4.0 | .057 | 72.5 | W. | 124 | 3.0 | 24 | 10 A | 1 P | 11 P | .30 | 3 |
| 23 | 6.0 | .095 | 71.5 | S.S.W. | 109 | 3.5 | 26 | 6 A | | | | |
| 24 | 23.0 | .165 | 84.5 | S.S.W. | 66 | 1.0 | 14 | 6 P | | | | |
| 25 | 31.5 | .258 | 67.0 | W. | 131 | 14.0 | 53 | 11 P | 10:30P | 12 P | .15 | |
| 26 | 23.0 | .192 | 70.0 | W.N.W. | 483 | 20.0 | 63 | 3 P | 0 A | 8 A | .61 | |
| 27 | 19.0 | .153 | 71.5 | W.S.W. | 360 | 4.0 | 28 | 1 P | | | | |
| 28 | 30.0 | .184 | 92.5 | S. | 89 | 0.0 | — | — | 11 A | 12 P | .40 | $\frac{1}{4}$ |

**Rain or melted snow at base of tower. *Included in following day.

# REMARKS

The weather during February was more nearly normal, especially the temperature record, than that of the preceeding two months. Abnormally low temperature, however, continued through the first third of the month. The mean for that period was less than ten degrees above zero, making it one of the coldest periods of the entire winter. For thirty-six consecutive hours, on the 4th—6th, the thermometer did not register above zero—a most unusual occurrence here. Large and rapid changes in barometric pressure and high winds were also important features.

A comparison of the records of the several weather elements with the normals for this station shows the following features of interest: The mean barometer was slightly higher than the normal and the range of pressure was almost as great as the normal *annual* range. The minimum barometer was exceptionally low. The total wind movement was large and on four dates gales of more than 50 miles per hour were recorded on the pressure chart. Throughout the month practically all of the wind was from the western points of the compass.

The mean temperature was nearly four degrees below the normal and the minimum record was more than fourteen degrees lower than the average value for this feature. The maximum temperature was practically normal giving a very large range for the month.

The mean dew point was about four degrees lower than usual and the relative humidity was slightly below the normal.

The total precipitation was about ten per cent. less than the normal and was well distributed throughout the month. Snow has covered the ground continuously since the first of December.

The amount of sunshine recorded was practically normal.

J. E. OSTRANDER, Meteorologist.

A. L. CHANDLER, Observer.

BULLETIN No. 351. MARCH, 1918

# Meteorological Observations
AT THE
# MASSACHUSETTS
# AGRICULTURAL EXPERIMENT
# STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.
*Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.*
*Height of Wind Instruments 72 ft.*

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## MONTHLY SUMMARY.

**Pressure.** In inches.

| | |
|---|---|
| Maximum reduced to freezing | 30.14, 11th, 10A |
| Minimum reduced to freezing | 29.14, 15th, 3 A |
| Reduced maximum reading | 30.46, 11th, 10A |
| Reduced† minimum reading | 29.45, 15th, 3 A |
| Mean semi-daily reduced | 29.989 |
| Monthly range | 1.01 |

***Air Temperature.** In Degrees Fahr.

| | |
|---|---|
| Highest | 69.0, 31st, 4 P |
| Lowest | 8.5, 11th, 7 A |
| Mean hourly | 34.9 |
| Mean of means of max. and min. | 35.4 |
| Mean sensible (wet bulb) | 30.3 |
| Monthly range | 60.5 |
| Highest mean daily | 51.3, 31st |
| Lowest mean daily | 18.6, 11th |
| Mean maximum | 47.0 |
| Mean minimum | 23.9 |
| Mean daily range | 23.1 |
| Greatest daily range | 36.5, 31st |
| Least daily range | 6.5, 1st |

**Humidity.**

| | |
|---|---|
| Mean dew point | 24.6 |
| Mean force of vapor | .203 |
| Mean relative humidity | 71.9 |

**Precipitation.** In inches.

| | |
|---|---|
| Total precipitation, in inches | 2.91 |
| Total snow, in inches | 9½ |
| Number of days on which .01 inch or more rain fell | 8 |
| Days of sleighing, | 10 |

**Wind.**

| | |
|---|---|
| Total movement | 5791 m |
| Greatest daily movement | 606m, 3d |
| Least daily movement | 37m, 21st |
| Mean daily movement | 184 m |
| Mean hourly velocity | 7.6 m |

Maximum pressure per square foot, 18.0 lbs = 60m per hour, 3d, 2 A, N.W.

Maximum velocity for 5 minutes, 38m per hour, 2d, 2 A, N.W.

Prevailing direction, West Northwest.

Summary.

| | |
|---|---|
| South Southwest | 13 per cent |
| North Northwest | 19 " " |
| Northwest | 23 " " |
| West | 10 " " |
| Southwest | 10 " " |
| Other directions | 25 " " |

**Weather.**

| | |
|---|---|
| Mean cloudiness observed | 36 per cent |
| Total cloudiness recorded by the Sun Thermometer | 117 hours = 32 per cent |
| Number of clear days | 13 |
| Number of fair days | 14 |
| Number of cloudy days | 4 |

**Bright Sunshine.**

Number hours recorded, 252 hrs, = 68 per cent

**Rain,** 1st, 6th, 10th, 14th.

**Snow,** 4th, 5th, 7th, 9th, 10th, 14th.

**Hail,** 1st, 9th, 10th.

**Thunder and Lightning,** 14th.

**Gales,** 60m, 3d, N.W.; 45m, 10th, N.; 36m, 12th, S.S.W.; 47m, 15th, N.W.

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*Temperature in ground shelter.

**Reduced to freezing and sea-level.

# DAILY SUMMARY.

| Day. | Barometer Reduced to Sea Level. | | | Temperature. Ground Shelter. | | | | | | | No. Hours of Bright Sunshine |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Maximum | Minimum. | Mean. Semi-daily | Maximum | Time. | Minimum. | Time. | Mean of Max. and Min. | Mean Hourly Draper. | Mean Sensible Wet Bulb. | |
| 1 | 30.24 | 30.09 | 30.156 | 35.5 | 3:30 P | 29.0 | 12 P | 32.3 | 32.1 | 32.0 | 0.8 |
| 2 | 30.23 | 29.67 | 30.015 | 43.5 | 12 P | 21.5 | 6 A | 32.5 | 33.3 | 30.7 | 9.5 |
| 3 | 30.34 | 29.65 | 30.030 | 43.5 | 0 A | 18.5 | 12 P | 31.0 | 30.5 | 25.0 | 10.0 |
| 4 | 30.39 | 29.97 | 30.219 | 36.0 | 4 P | 12.0 | 7 A | 24.0 | 24.5 | 21.7 | 6.0 |
| 5 | 29.97 | 29.82 | 29.799 | 47.5 | 3 P | 28.5 | 0 A | 38.0 | 36.5 | 34.0 | 7.5 |
| 6 | 29.82 | 29.54 | 29.659 | 47.0 | 3:30 P | 29.5 | 12 P | 38.3 | 38.2 | 33.7 | 5.2 |
| 7 | 30.07 | 29.73 | 29.884 | 29.5 | 0 A | 16.5 | 12 P | 23.0 | 23.3 | 20.5 | 8.0 |
| 8 | 30.13 | 30.01 | 30.071 | 43.0 | 4 P | 10.5 | 5:30 A | 26.7 | 27.1 | 25.5 | 8.7 |
| 9 | 30.24 | 29.90 | 30.160 | 39.0 | 2 P | 28.0 | 4 A | 33.5 | 32.6 | 28.3 | 7.7 |
| 10 | 30.18 | 29.51 | 29.794 | 32.0 | 3 A | 10.5 | 7:30 P | 21.3 | 22.3 | 15.7 | 0.9 |
| 11 | 30.46 | 30.18 | 30.388 | 28.0 | 5 P | 8.5 | 7 A | 18.3 | 18.6 | 15.7 | 7.0 |
| 12 | 30.31 | 29.76 | 29.891 | 41.0 | 10 P | 18.0 | 6 A | 29.5 | 31.6 | 33.0 | 2.4 |
| 13 | 30.10 | 29.75 | 30.021 | 50.5 | 3:30 P | 36.0 | 10 P | 43.3 | 41.1 | 32.7 | 8.5 |
| 14 | 30.05 | 29.49 | 29.794 | 39.0 | 0 A | 30.0 | 9 A | 34.5 | 33.0 | 30.0 | 0.0 |
| 15 | 30.30 | 29.45 | 29.958 | 38.5 | 3:30 P | 11.0 | 12 P | 24.7 | 25.9 | 20.7 | 9.3 |
| 16 | 30.32 | 30.08 | 30.184 | 38.0 | 5 P | 10.0 | 5 A | 24.0 | 25.0 | 24.0 | 10.0 |
| 17 | 30.08 | 29.68 | 29.820 | 56.5 | 3 P | 24.5 | 5 A | 40.5 | 41.6 | 36.0 | 10.5 |
| 18 | 30.04 | 29.75 | 30.006 | 48.0 | 4 P | 33.5 | 7 A | 40.7 | 38.9 | 31.0 | 11.2 |
| 19 | 30.18 | 29.92 | 30.054 | 58.0 | 3 P | 26.5 | 7 A | 42.3 | 40.2 | 33.3 | 10.5 |
| 20 | 30.21 | 30.06 | 30.124 | 54.0 | 5 P | 27.5 | 7 A | 40.7 | 39.4 | 35.7 | 8.7 |
| 21 | 30.06 | 29.89 | 29.970 | 63.0 | 4:30 P | 33.0 | 8:30 A | 48.0 | 43.5 | 41.3 | 7.8 |
| 22 | 29.89 | 29.66 | 29.782 | 66.0 | 5 P | 37.0 | 5:30 A | 51.5 | 47.7 | 39.0 | 9.1 |
| 23 | 30.20 | 29.86 | 30.105 | 45.0 | 3:30 P | 28.0 | 12 P | 36.5 | 36.7 | 31.0 | 11.7 |
| 24 | 30.19 | 29.91 | 30.056 | 56.5 | 5:30 P | 22.0 | 5:30 A | 39.3 | 37.6 | 32.5 | 11.3 |
| 25 | 29.91 | 29.54 | 29.676 | 55.5 | 2 P | 30.5 | 0 A | 43.0 | 40.9 | 34.5 | 10.0 |
| 26 | 29.81 | 29.52 | 29.674 | 40.0 | 2 P | 29.0 | 12 P | 34.5 | 35.0 | 30.5 | 6.7 |
| 27 | 30.11 | 29.81 | 29.979 | 38.0 | 2:30 P | 24.5 | 7 A | 31.3 | 32.1 | 29.7 | 8.1 |
| 28 | 30.28 | 30.11 | 30.239 | 52.0 | 5 P | 22.0 | 7 A | 37.0 | 36.6 | 31.0 | 12.0 |
| 29 | 30.37 | 30.18 | 30.289 | 60.5 | 4:30 P | 26.5 | 7 A | 43.5 | 41.8 | 34.0 | 12.0 |
| 30 | 30.18 | 29.87 | 29.990 | 63.5 | 3 P | 27.5 | 6 A | 45.5 | 44.1 | 37.0 | 10.5 |
| 31 | 29.89 | 29.77 | 29.860 | 69.0 | 4 P | 32.5 | 6:30 A | 50.7 | 51.3 | 40.7 | 10.9 |

# DAILY SUMMARY.

| | Humidity. | | | Wind. | | | | | Precipitation. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Total in Inches. | |
| | Mean Dew Point. | Mean Force vapor. | Mean Relative Humidity. | Prevailing Direction. | Total Movement in Miles. | Maximum Pressure Per Square Ft | Miles per Hour. | Time. | Beginning. | Ending. | Rain.** | Snow. |
| 1 | 30.5 | .185 | 92.5 | N.N.W. | 55 | 1.5 | 17 | 11 P | 0 A | 1:30 P | .96 | |
| 2 | 26.5 | .188 | 79.5 | W. | 197 | 3.0 | 24 | 9 A | | | | |
| 3 | 17.5 | .152 | 63.5 | N.W. | 606 | 18.0 | 60 | 2 A | | | | |
| 4 | 17.0 | .130 | 79.0 | S.S.W. | 239 | 5.5 | 33 | 6 P | 8 P | 12 P | .06 | 1¼ |
| 5 | 31.0 | .213 | 83.0 | S.S.W. | 102 | 0.5 | 10 | 1 A | 0 A | 3 A | .08 | ¾ |
| 6 | 29.0 | .215 | 76.5 | W.N.W. | 194 | 2.5 | 22 | 7 A | 3 A | 9 A | .19 | |
| 7 | 15.0 | .121 | 73.0 | N.N.E. | 175 | 1.0 | 14 | 11 P | 2 A | 1:30 P | .21 | 3 |
| 8 | 21.5 | .152 | 81.0 | S.W. | 136 | 1.0 | 14 | 11 P | | | | |
| 9 | 21.5 | .173 | 70.5 | W. | 162 | 2.5 | 22 | 1 A | 6 P | 12 P | .40 | 1½ |
| 10 | 16.0 | .115 | 84.5 | N. | 224 | 10.0 | 45 | 9 P | 0 A | 7 P | .65 | 1¾ |
| 11 | 9.5 | .100 | 69.0 | S.W. | 208 | 2.0 | 20 | 3 P | | | | |
| 12 | 30 5 | .194 | 87.5 | S.S.W. | 215 | 6.5 | 36 | 2 P | | | | |
| 13 | 24.0 | .224 | 59 0 | N.W. | 215 | 4.0 | 28 | 6 A | | | | |
| 14 | 27.0 | .176 | 85.0 | N.E. | 89 | 0.5 | 10 | 4 A | 5 A | 7:30 P | .36 | 1¼ |
| 15 | 12.0 | .240 | 61.0 | N.W. | 408 | 11.0 | 47 | 1 P | | | | |
| 16 | 18 0 | .151 | 71.5 | W.N.W. | 284 | 3.5 | 26 | 1 P | | | | |
| 17 | 26.0 | .270 | 53.5 | W. | 221 | 4.5 | 30 | 11 P | | | | |
| 18 | 22 0 | .208 | 59 0 | N.W. | 262 | 5.5 | 33 | 0 A | | | | |
| 19 | 28.0 | .216 | 71.5 | S.S.W. | 98 | 0.5 | 10 | 6 P | | | | |
| 20 | 31.5 | .235 | 78.0 | S. | 104 | 0.5 | 10 | 3 P | | | | |
| 21 | 39 0 | .287 | 89.5 | S. | 37 | 0.0 | — | — | | | | |
| 22 | 35.0 | .294 | 78.5 | N.N.W. | 100 | 3.0 | 24 | 1 P | | | | |
| 23 | 23.5 | .203 | 63.5 | N.N.W. | 303 | 5.5 | 33 | 1 P | | | | |
| 24 | 26.0 | .215 | 65.0 | N.N.W. | 83 | 1.0 | 14 | 9 A | | | | |
| 25 | 27.5 | .222 | 64.5 | N.W. | 260 | 1.5 | 17 | 2 P | | | | |
| 26 | 24.0 | .192 | 71.0 | N.W. | 176 | 3.0 | 24 | 3 P | | | | |
| 27 | 25.5 | .180 | 77.5 | N.W. | 170 | 2.0 | 20 | 2 P | | | | |
| 28 | 24.0 | .202 | 65.0 | N.N.W. | 183 | 1.5 | 17 | 3 P | | | | |
| 29 | 24.0 | .244 | 56 0 | N.N.W. | 480 | 0.0 | — | — | | | | |
| 30 | 29.5 | .270 | 61.0 | S.W. | 88 | 1.0 | 14 | 3 P | | | | |
| 31 | 33.0 | .337 | 60.0 | S.W. | 10 | 1.5 | 17 | 2 P | | | | |

**Rain or melted snow at base of tower. *Included in following day.

## REMARKS

The weather during March was much nearer normal than during the preceding two months. This was especially noticeable in the temperature record after the unprecedented cold which had prevailed. The accumulated snow of the winter which covered the ground at the beginning of the month gradually disappeared without any especially noticeable high water in the rivers, and the equinoctial period was free from storms. At the close of the month, while there was still much frost in the ground, the snow had practically all disappeared. No precipitation was recorded after ihe 14th.

The record of the several weather elements shows the following as the more important features: The mean barometer was practically normal and the range unusually small for the time of year. Although the barometer during the month was comparatively steady the total wind movement was practically normal. The wind movement on the 3d of more than 600 miles was an exceptionally high record for this station.

The mean temperature was slightly higher than the normal, and the maximum was recorded on the last day of the month. The range of temperature was more than usual.

The mean dew point and relative humidity were bolh below the normal values.

The total precipitation was about three-fourths of the normal amount and occurred in a few storms early in the month.

The sunshine record was unusually large and there were but few cloudy days.

J. E. OSTRANDER, Meteorologist.

A. L. CHANDLER, Observer.

BULLETIN No. 352. APRIL, 1918

# Meteorological Observations
AT THE
# MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.
*Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.*
*Height of Wind Instruments 72 ft.*

## MONTHLY SUMMARY.

**Pressure.** In inches.

| | |
|---|---|
| Maximum reduced to freezing | 30.24, 7th, 9 A |
| Minimum reduced to freezing | 29.29, 22d, 5 A |
| Reduced maximum reading | 30.55, 7th, 9 A |
| Reduced† minimum reading | 29.59, 22d, 5 A |
| Mean semi-daily reduced | 30.071 |
| Monthly range | 0.96 |

***Air Temperature.** In Degrees Fahr.

| | |
|---|---|
| Highest | 79.5, 30th, 3 P |
| Lowest | 24.0, 6th, 6:30 A |
| Mean hourly | 45.7 |
| Mean of means of max. and min. | 46.2 |
| Mean sensible (wet bulb) | 40.1 |
| Monthly range | 55.5 |
| Highest mean daily | 62.4, 30th |
| Lowest mean daily | 31.7, 11th |
| Mean maximum | 58.5 |
| Mean minimum | 33.9 |
| Mean daily range | 24.6 |
| Greatest daily range | 44.5, 15th |
| Least daily range | 7.0, 12th |

**Humidity.**

| | |
|---|---|
| Mean dew point | 33.6 |
| Mean force of vapor | .304 |
| Mean relative humidity | 69.2 |

**Precipitation.** In inches.

| | |
|---|---|
| Total precipitation, in inches | 2.78 |
| Total snow, in inches | 4½ |
| Number of days on which .01 inch or more rain fell | 13 |

**Wind.**

| | |
|---|---|
| Total movement | 4544 m |
| Greatest daily movement | 341 m, 24th |
| Least daily movement | 46 m, 17th |
| Mean daily movement | 151 m |
| Mean hourly velocity | 6.3 m |

Maximum pressure per square foot, 7.5 lbs = 39m per hour, 24th, 12 M, W.N.W.

Maximum velocity for 5 minutes, 29m per hour, 24th, 12 M, W.N.W.

Prevailing direction, Northwest.

Summary.

| | |
|---|---|
| North | 23 per cent |
| South Southwest | 10 " " |
| North Northeast | 10 " " |
| West Northwest | 10 " " |
| West | 10 " " |
| North Northwest | 10 " " |
| Other directions | 27 " " |

**Weather.**

| | |
|---|---|
| Mean cloudiness observed | 52 per cent |
| Total cloudiness recorded by the Sun Thermometer | 167 hours = 42 per cent |
| Number of clear days | 10 |
| Number of fair days | 13 |
| Number of cloudy days | 7 |

**Bright Sunshine.**

Number hours recorded, 235 hrs, = 58 per cent

**Rain,** 3d, 8th, 9th, 11th, 12th, 13th, 17th, 18th, 19th, 21st, 22d, 23d, 29th, 30th.

**Snow,** 11th, 12th, 13th.

**Hail,** 18th.

**Thunder and Lightning,** 17th, 23d.

**Frosts,** 5th, 6th, 7th, 14th, 15th, 20th, 25th, 26th.

**Gales,** 35 miles or more per hour: 39m. 24th, W.N.W.

*Temperature in ground shelter.

**Reduced to freezing and sea-level.

# DAILY SUMMARY.

| Day. | Barometer Reduced to Sea Level. | | | Temperature. Ground Shelter. | | | | | | | No. Hours of Bright Sunshine |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Maximum | Minimum. | Mean. Semi-daily | Maximum | Time. | Minimum. | Time. | Mean of Max. and Min. | Mean Hourly Draper. | Mean Sensible Wet Bulb. | |
| 1 | 29.82 | 29.69 | 29.783 | 73.5 | 2 P | 37.5 | 6 A | 55.5 | 54.3 | 46.3 | 10.5 |
| 2 | 29.84 | 29.70 | 29.777 | 72.0 | 2:30 P | 47.0 | 7 A | 59.5 | 56.6 | 48.0 | 8.2 |
| 3 | 29.93 | 29.80 | 29.883 | 52.5 | 1 P | 35.5 | 11 P | 44.0 | 44.0 | 38.5 | 3.2 |
| 4 | 30.05 | 29.85 | 29.980 | 50.0 | 3:30 P | 31.0 | 7 A | 40.5 | 38.0 | 30.3 | 10.1 |
| 5 | 30.30 | 30.05 | 30.233 | 48.0 | 5 P | 26.0 | 6 A | 37.0 | 37.1 | 30.7 | 12.1 |
| 6 | 30.43 | 30.26 | 30.367 | 63.0 | 5 P | 24.0 | 6:30 A | 43.5 | 44.4 | 37.0 | 12.1 |
| 7 | 30.55 | 30.43 | 30.523 | 61.5 | 2:30 P | 29.0 | 5:30 A | 45.3 | 44.1 | 37.0 | 10.8 |
| 8 | 30.53 | 30.23 | 30.396 | 58.5 | 3:30 P | 31.5 | 5 A | 45.0 | 45.7 | 40.3 | 6.1 |
| 9 | 30.35 | 30.17 | 30.298 | 49.0 | 12 M | 30.0 | 12 P | 39.5 | 40.8 | 37.3 | 1.7 |
| 10 | 30.45 | 30.16 | 30.434 | 49.5 | 3:30 P | 29.5 | 6 A | 39.5 | 38.1 | 33.3 | 7.6 |
| 11 | 30.44 | 30.19 | 30.325 | 43.5 | 2 P | 33.0 | 6 A | 38.3 | 36.8 | 30.7 | 6.5 |
| 12 | 30.19 | 29.98 | 30.038 | 36.0 | 0 A | 29.0 | 9 P | 32.5 | 31.7 | 30.3 | 0.8 |
| 13 | 30.02 | 29.91 | 29.964 | 39.0 | 3 P | 29.5 | 1 A | 34.3 | 35.2 | 34.5 | 4.9 |
| 14 | 30.06 | 29.95 | 29.992 | 63.0 | 3 P | 35.0 | 0 A | 49.0 | 48.3 | 42.0 | 10.7 |
| 15 | 30.09 | 29.98 | 30.042 | 73.5 | 4 P | 29.0 | 6 A | 51.3 | 52.9 | 42.5 | 11.8 |
| 16 | 30.06 | 29.86 | 29.964 | 71.0 | 3 P | 35.0 | 6 A | 53.0 | 54.2 | 45.3 | 9.6 |
| 17 | 29.86 | 29.61 | 29.732 | 73.0 | 3 P | 36.5 | 5:30 A | 54.7 | 54.4 | 48.5 | 8.2 |
| 18 | 30.04 | 29.60 | 29.914 | 54.0 | 0 A | 32.0 | 12 P | 43.0 | 38.4 | 33.3 | 0.0 |
| 19 | 30.47 | 30.03 | 30.328 | 50.0 | 4 P | 32.0 | 0 A | 41.0 | 38.9 | 32.0 | 11.0 |
| 20 | 30.50 | 30.24 | 30.387 | 52.0 | 2:30 P | 26.5 | 6 A | 39.3 | 41.7 | 33.5 | 7.8 |
| 21 | 30.24 | 29.65 | 29.895 | 45.0 | 0 A | 37.0 | 10:30 A | 41.0 | 39.8 | 38.3 | 0.0 |
| 22 | 29.77 | 29.59 | 29.665 | 59.0 | 3:30 P | 39.0 | 0 A | 49.0 | 47.4 | 43.7 | 7.3 |
| 23 | 29.84 | 29.70 | 29.801 | 70.5 | 3 P | 42.0 | 5 A | 56.3 | 54.1 | 52.5 | 9.0 |
| 24 | 30.13 | 29.74 | 29.980 | 47.5 | 5 P | 37.0 | 12 P | 42.3 | 41.9 | 35.3 | 10.7 |
| 25 | 30.24 | 30.10 | 30.156 | 58.5 | 5 P | 32.0 | 6 A | 45.3 | 44.5 | 38.0 | 12.3 |
| 26 | 30.27 | 30.14 | 30.220 | 69.0 | 5:30 P | 28.5 | 6 A | 48.7 | 49.3 | 44.7 | 12.5 |
| 27 | 30.27 | 30.16 | 30.225 | 69.0 | 2 P | 31.0 | 6:30 A | 50.0 | 51.1 | 42.0 | 9.7 |
| 28 | 30.21 | 30.04 | 30.106 | 69.0 | 2 P | 34.5 | 5:30 A | 51.7 | 54.0 | 48.0 | 11.9 |
| 29 | 30.10 | 29.87 | 29.953 | 55.5 | 8:30 A | 45.0 | 3:30 A | 50.3 | 51.1 | 51.5 | 0.0 |
| 30 | 29.91 | 29.77 | 29.824 | 79.5 | 3 P | 51.0 | 5:30 A | 65.3 | 62.4 | 56.5 | 7.7 |

# DAILY SUMMARY.

| Day. | Humidity. | | | Wind. | | | | | Precipitation. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Mean Dew Point. | Mean Force vapor. | Mean Relative Humidity. | Prevailing Direction. | Total Movement in Miles. | Maximum Pressure Per Square Ft | Miles per Hour. | Time. | Beginning. | Ending. | Total in Inches. | |
| | | | | | | | | | | | Rain.** | Snow. |
| 1 | 42.0 | .367 | 75.5 | S.S.W. | 171 | 3.5 | 26 | 5 P | | | | |
| 2 | 42.0 | .413 | 71.0 | W. | 154 | 2.5 | 22 | 3 P | | | | |
| 3 | 33.0 | .272 | 74.0 | N. | 91 | 1.0 | 14 | 12 P | 0:30 P | 8 P | .15 | |
| 4 | 19.0 | .209 | 53.0 | N. | 197 | 3.5 | 26 | 7 P | | | | |
| 5 | 17.0 | .213 | 46.5 | N.N.W. | 256 | 4.0 | 28 | 10 A | | | | |
| 6 | 27.0 | .276 | 54.5 | N.W. | 70 | 0.5 | 10 | 12 M | | | | |
| 7 | 30.5 | .261 | 70.0 | S.S.W. | 151 | 3.5 | 26 | 12 M | | | | |
| 8 | 34.5 | .295 | 69.5 | S. | 71 | 0.5 | 10 | 8 P | 3:30 P | 5:30 P | T | |
| 9 | 35.5 | .241 | 88.5 | N. | 164 | 3.0 | 24 | 7 P | 1 A | 8 P | .15 | |
| 10 | 28.5 | .328 | 77.0 | N.N.E. | 319 | 3.5 | 26 | 3 P | | | | |
| 11 | 24.0 | .198 | 65.5 | N.E. | 247 | 4.0 | 28 | 8 A | 10:30 P | 12 P | .02 | ½ |
| 12 | 28.0 | .172 | 92.5 | N. | 217 | 2.0 | 20 | 1 P | 0 A | 12 P | .48 | 3¼ |
| 13 | 31.5 | .217 | 82.0 | N. | 158 | 1.5 | 17 | 2 P | 0 A | 8:30 A | .11 | ¾ |
| 14 | 33.5 | .341 | 58.5 | N. | 189 | 3.0 | 24 | 11 A | | | | |
| 15 | 33.0 | .371 | 54.0 | N.N.W. | 73 | 1.5 | 17 | 4 P | | | | |
| 16 | 37.0 | .389 | 57.0 | W.N.W. | 53 | 1.0 | 14 | 4 P | | | | |
| 17 | 44.5 | .396 | 77.0 | W. | 46 | 1.0 | 14 | 12 M | 7 P | 12 P | .22 | |
| 18 | 30.5 | .203 | 83.5 | E. | 83 | 0.5 | 10 | 11 A | 8 A | 12 P | .06 | |
| 19 | 20.0 | .226 | 53.5 | N.N.E. | 165 | 2.5 | 22 | 9 A | 0 A | 5:30 A | .03 | |
| 20 | 22.0 | .252 | 49.0 | W.S.W. | 77 | 0.5 | 10 | 1 P | | | | |
| 21 | 36.5 | .239 | 91.5 | N. | 130 | 0.5 | 10 | 4 P | 3:30 A | 9:30 P | .87 | |
| 22 | 41.0 | .313 | 83.0 | W.N.W. | 176 | 4.5 | 30 | 10 A | 6:30 A | 10:30 A | .24 | |
| 23 | 47.0 | .314 | 80.5 | S.W. | 187 | 2.5 | 22 | 3 P | 8 P | 9:30 P | .25 | |
| 24 | 28.5 | .243 | 65.0 | W.N.W. | 341 | 7.5 | 39 | 12 M | | | | |
| 25 | 28.5 | .292 | 54.5 | N.W. | 239 | 3.0 | 24 | 10 A | | | | |
| 26 | 35.0 | .393 | 56.0 | N.N.W. | 139 | 3.0 | 24 | 10 A | | | | |
| 27 | 33.0 | .350 | 56.0 | S. | 78 | 0.5 | 10 | 2 P | | | | |
| 28 | 42.0 | .406 | 65.5 | W. | 129 | 1.0 | 14 | 2 P | | | | |
| 29 | 50.5 | .412 | 95.0 | N.N.E. | 49 | 0.0 | — | — | 9:30 A | 12 P | .15 | |
| 30 | 54.0 | .533 | 79.0 | S.S.W. | 124 | 2.0 | 20 | 6 P | 0 A | 3 A | .05 | |

**Rain or melted snow at base of tower. *Included in following day.

## REMARKS

The weather during April was nearly normal in most respects and presented but few features of especial interest. A snowstorm on the 11th–13th, of more than four inches was perhaps the most unusual feature. The middle third of the month was rather cold and more or less stormy and delayed the season's progress to a considerable extent. At the close of the month the seasonal advance was hardly up to the normal.

The various weather elements show the following features of more or less interest: The mean barometer was considerably higher than the normal and the range of pressure rather small for the season. The maximum barometer was about the usual value while the minimum was considerably higher than the normal for this feature. The rather steady barometric pressure gave a total wind movement of about eighty per cent of the normal, and but a single gale was recorded on the pressure chart. The wind was from the northerly points of the compass more than one-half the time.

The mean temperature was nearly normal and the range slightly smaller than usual. The last day of the month was much the warmest and the maximum temperature reading was recorded that day. Freezing temperature was recorded near the end of the month but no material damage resulted.

The mean dew point was slightly lower than normal and the relative humidity a little higher than usual.

The total precipitation was about nine-tenths of the normal and was fairly well distributed throughout the month. The rainstorm of the 21st was the greatest of the month. The amount of sunshine was in excess of the average.

J. E. OSTRANDER, Meteorologist.

A. L. CHANDLER, Observer.

Note—The regular observations at this station are continued at 8 A. M. and 8 P. M. *75th meridian time.*

BULLETIN No. 353. MAY, 1918

# Meteorological Observations

AT THE

# MASSACHUSETTS
# AGRICULTURAL EXPERIMENT
# STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.
*Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.*
*Height of Wind Instruments 72 ft.*

## MONTHLY SUMMARY.

**Pressure.** In inches.

| | |
|---|---|
| Maximum reduced to freezing | 30.20, 16th, 6 A |
| Minimum reduced to freezing | 29.22, 10th, 6 P |
| Reduced maximum reading | 30.50, 16th, 6 A |
| Reduced† minimum reading | 29.51, 10th, 6 P |
| Mean semi-daily reduced | 30.061 |
| Monthly range | 0.99 |

***Air Temperature.** In Degrees Fahr.

| | |
|---|---|
| Highest | 86.5, 7th, 2 P; 28th, 4:30 P |
| Lowest | 36.0, 2d, 5 A |
| Mean hourly | 62.1 |
| Mean of means of max. and min. | 62.2 |
| Mean sensible (wet bulb) | 55.7 |
| Monthly range | 50.5 |
| Highest mean daily | 74.0, 28th |
| Lowest mean daily | 31.2, 1st |
| Mean maximum | 74.8 |
| Mean minimum | 49.7 |
| Mean daily range | 25.1 |
| Greatest daily range | 38.0, 18th |
| Least daily range | 7.5, 30th |

**Humidity.**

| | |
|---|---|
| Mean dew point | 53.1 |
| Mean force of vapor | .545 |
| Mean relative humidity | 72.2 |

**Precipitation.** In inches.

| | |
|---|---|
| Total precipitation, in inches | 2.47 |
| Total snow, in inches | |
| Number of days on which .01 inch or more rain fell | 12 |

*Temperature in ground shelter.
**Reduced to freezing and sea-level.

**Wind.**

| | |
|---|---|
| Total movement | 4906 m |
| Greatest daily movement | 345m, 10th |
| Least daily movement | 57m 22d |
| Mean daily movement | 158 m |
| Mean hourly velocity | 6.6 m |

Maximum pressure per square foot, 6.5 lbs = 36m per hour, 6th, 3 P, S.S.W.; 10th, 4P, S.

Maximum velocity for 5 minutes, 24m per hour, 10th, 4 P, S.

Prevailing direction, South Southwest.

Summary.

| | |
|---|---|
| South | 23 per cent |
| South Southwest | 29 " " |
| Other directions | 48 " " |

**Weather.**

| | |
|---|---|
| Mean cloudiness observed | 51 per cent |
| Total cloudiness recorded by the Sun Thermometer | 195 hours = 43 per cent |
| Number of clear days | 7 |
| Number of fair days | 16 |
| Number of cloudy days | 8 |

**Bright Sunshine.**

Number hours recorded, 258 hrs, = 57 per cent

**Rain.** 1st, 6th, 10th, 12th, 13th, 14th, 21st, 22d, 25th, 27th, 29th, 30th, 31st.

**Thunder and Lightning,** 6th, 10th, 27th.

**Frosts,** None.

**Gales,** 35 miles or more per hour: 36m. 6th, S.S.W.; 35m, 8th, S.W.; 36m, 10th, S.

# DAILY SUMMARY.

| Day. | Barometer Reduced to Sea Level. | | | Temperature. Ground Shelter. | | | | | | | No. Hours of Bright Sunshine |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Maximum | Minimum. | Mean. Semi-daily | Maximum | Time. | Minimum. | Time. | Mean of Max. and Min. | Mean Hourly Draper. | Mean Sensible Wet Bulb. | |
| 1 | 30.04 | 29.68 | 29.857 | 59.5 | 12 M | 44.0 | 12 P | 51.7 | 51.2 | 46.7 | 2.1 |
| 2 | 30.21 | 30.03 | 30.122 | 66.5 | 4 P | 36.0 | 5 A | 51.3 | 54.1 | 48.7 | 9 6 |
| 3 | 30.03 | 29.87 | 29 935 | 67.0 | 4:30 P | 48.5 | 6 A | 57.7 | 58.9 | 52.0 | 11.0 |
| 4 | 30.03 | 29.85 | 29 920 | 71.0 | 2:30 P | 46.0 | 6 A | 58.5 | 58.1 | 50.5 | 11.4 |
| 5 | 30.09 | 29.93 | 30 041 | 70.0 | 2:30 P | 37.0 | 5:30 A | 53.5 | 54.0 | 47 0 | 11.7 |
| 6 | 30.00 | 29.86 | 29.935 | 86.0 | 1 P | 49.0 | 2 A | 67.5 | 66.0 | 59.7 | 9.0 |
| 7 | 29.93 | 29.66 | 29.759 | 86.5 | 2 P | 59.0 | 6 A | 72.7 | 71.5 | 62.5 | 8.5 |
| 8 | 29.88 | 29 66 | 29.754 | 72.0 | 2 P | 45.0 | 12 P | 58.5 | 61.5 | 52.0 | 9.2 |
| 9 | 29 97 | 29 88 | 29.933 | 73 0 | 5:30 P | 38.5 | 5:30 A | 55.7 | 57.2 | 51.5 | 12.3 |
| 10 | 29.90 | 29.51 | 29 658 | 78.0 | 2:30 P | 51.0 | 4 A | 64 5 | 63.8 | 57.5 | 10.2 |
| 11 | 30.10 | 29.66 | 30.015 | 74 5 | 5:30 P | 46.0 | 6 A | 60.3 | 58 4 | 49.5 | 12.2 |
| 12 | 30.13 | 29.96 | 30.046 | 74.5 | 2:30 P | 50.5 | 5 A | 62.5 | 60.7 | 56.0 | 4.3 |
| 13 | 30.01 | 29.88 | 29 976 | 80.5 | 2:30 P | 61.0 | 0 A | 70.7 | 67.6 | 62.7 | 7.5 |
| 14 | 30 26 | 29.99 | 30.142 | 71.0 | 5 P | 50.5 | 12 P | 60.7 | 60.7 | 56 3 | 4.5 |
| 15 | 30.43 | 30.26 | 30.372 | 75.0 | 5 P | 44 5 | 5 A | 59.7 | 60.0 | 51.0 | 13.3 |
| 16 | 30.50 | 30.35 | 30.417 | 74.0 | 3:30 P | 41.0 | 5 A | 57.5 | 58.7 | 48.3 | 12.5 |
| 17 | 30.38 | 30.22 | 30.333 | 85.0 | 3 P | 43.0 | 6 A | 64.0 | 64.0 | 52.5 | 11.5 |
| 18 | 30.27 | 30.10 | 30.195 | 86.0 | 3 P | 48.0 | 5:30 A | 67.0 | 66.7 | 56.0 | 11.2 |
| 19 | 30.12 | 30 01 | 30.102 | 83.0 | 2 P | 53.0 | 5:30 A | 68.0 | 67.1 | 61.0 | 9.0 |
| 20 | 30.14 | 30.06 | 30.138 | 84.0 | 3 P | 58.0 | 4:30 A | 71.0 | 69.7 | 62 5 | 9.5 |
| 21 | 30.29 | 30.15 | 30.267 | 73.5 | 3:30 P | 61.5 | 5:30 A | 67.5 | 66.7 | 64.0 | 3.3 |
| 22 | 30.29 | 30 08 | 30.208 | 68 5 | 5:30 P | 58.0 | 12 P | 63.3 | 62.5 | 59 0 | 1.3 |
| 23 | 30.21 | 29.95 | 30 063 | 79 5 | 2:30 P | 52.5 | 12 P | 66 0 | 65 6 | 59.0 | 9.7 |
| 24 | 30 35 | 30.21 | 30.292 | 73.5 | 3 P | 44.5 | 5:30 A | 59 0 | 58.9 | 49.7 | 12.5 |
| 25 | 30.23 | 29.85 | 29 987 | 73 5 | 4 P | 49.0 | 3 A | 61.5 | 61.3 | 58.7 | 8.5 |
| 26 | 30.17 | 29.92 | 30.108 | 73.0 | 2:30 P | 56.0 | 12 P | 64.5 | 64.2 | 57.5 | 9.0 |
| 27 | 30.14 | 29.91 | 29.968 | 81.0 | 6 P | 51.0 | 5:30 A | 66.0 | 64.7 | 62.0 | 8.0 |
| 28 | 30.14 | 29.92 | 29.983 | 86.5 | 4:30 P | 63.5 | 4 A | 75.0 | 74.0 | 68.0 | 9.5 |
| 29 | 30.29 | 30.14 | 30.248 | 62.5 | 3:30 P | 52.0 | 12 P | 57.3 | 58.7 | 54.7 | 0.5 |
| 30 | 30.23 | 30.12 | 30.194 | 57.0 | 6:30 P | 49.5 | 4 A | 53.3 | 53.6 | 51.3 | 0.2 |
| 31 | 30.12 | 29.82 | 29.908 | 73.0 | 4:30 P | 53.5 | 5 A | 63.3 | 61.1 | 58.3 | 5.5 |

# DAILY SUMMARY.

| | Humidity. | | | Wind. | | | | | Precipitation. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Total in Inches. | |
| Day. | Mean Dew Point. | Mean Force vapor. | Mean Relative Humidity. | Prevailing Direction. | Total Movement in Miles. | Maximum Pressure Per Square Ft | Miles per Hour. | Time. | Beginning. | Ending. | Rain.** | Snow. |
| 1 | 45.0 | .341 | 88.0 | N. | 205 | 2.5 | 22 | 2 P | 0 A | 8 P | 90 | |
| 2 | 41.5 | .444 | 60.5 | W.N.W. | 196 | 3.5 | 26 | 5 P | | | | |
| 3 | 45.0 | .497 | 61.5 | N.W. | 155 | 2.0 | 20 | 3 P | | | | |
| 4 | 43.5 | .478 | 59.5 | N. | 84 | 1.0 | 14 | 3 P | | | | |
| 5 | 42.0 | .389 | 68.0 | S.S.W. | 176 | 4.5 | 30 | 4 P | | | | |
| 6 | 56.5 | .625 | 74.5 | S.W. | 115 | 6.5 | 36 | 3 P | 10:30 P | 11 P | .03 | |
| 7 | 59.0 | .751 | 67.5 | S.S.W. | 154 | 3.5 | 26 | 6 P | | | | |
| 8 | 46.5 | .507 | 66.5 | S. | 310 | 6.0 | 35 | 11 A | | | | |
| 9 | 45.0 | .494 | 60.0 | W. | 157 | 2.0 | 20 | 1 P | | | | |
| 10 | 53.5 | .565 | 74.0 | S. | 345 | 6.5 | 36 | 4 P | 7 P | 7:30 P | .06 | |
| 11 | 43.0 | .432 | 61.5 | S.S.W. | 163 | 4.5 | 30 | 1 A | | | | |
| 12 | 54.0 | .505 | 82.5 | S. | 174 | 2.5 | 22 | 3 P | 1 P | | T | |
| 13 | 61.0 | .638 | 85.0 | S.S.W. | 312 | 5.0 | 32 | 4 P | 8:30 P | 12 P | .40 | |
| 14 | 54.0 | .510 | 84.5 | N.W. | 102 | 1.0 | 14 | 1 A | 0 A | 7:30 A | .30 | |
| 15 | 42.5 | .512 | 53.5 | N.N.W. | 98 | 1.0 | 14 | 11 A | | | | |
| 16 | 39.5 | .456 | 55.0 | S. | 144 | 1.0 | 14 | 12 M | | | | |
| 17 | 44.5 | .570 | 53.5 | S.S.W. | 73 | 0.0 | — | — | | | | |
| 18 | 49.5 | .588 | 61.5 | S.S.W. | 130 | 1.5 | 17 | 6 P | | | | |
| 19 | 58.0 | .622 | 78.5 | S.S.W. | 228 | 3.5 | 26 | 3 P | | | | |
| 20 | 59.5 | .673 | 76.0 | S.S.W. | 272 | 4.5 | 30 | 3 P | | | | |
| 21 | 62.5 | .639 | 90.0 | E. | 94 | 0.0 | — | — | 5:30 A | 10 A | .13 | |
| 22 | 57.0 | .554 | 84.0 | E. | 57 | 0.0 | — | — | 1 A | 5 A | .08 | |
| 23 | 55.5 | .597 | 75.0 | S. | 139 | 3.0 | 24 | 2 P | | | | |
| 24 | 40.5 | .496 | 51.5 | S.W. | 166 | 3.0 | 24 | 5 P | | | | |
| 25 | 55.0 | .544 | 80.0 | S | 177 | 3.5 | 26 | 3 P | 6:30 P | 10 P | .43 | |
| 26 | 52.5 | .607 | 66.5 | E.S.E. | 137 | 1.0 | 14 | 3 P | | | | |
| 27 | 61.0 | .606 | 92.5 | S. | 149 | 2.0 | 20 | 6 A | 2:30 A | 3 A | .06 | |
| 28 | 65.0 | .827 | 75.0 | W.N.W. | 135 | 3.5 | 26 | 2 P | | | | |
| 29 | 52.5 | .480 | 82.0 | S.S.E. | 77 | 0.0 | — | — | 4 P | 10 P | .04 | |
| 30 | 49.0 | .415 | 83.0 | S.S.E. | 73 | 0.5 | 10 | 10 P | 6 A | 7 A | .03 | |
| 31 | 57.0 | .524 | 87.5 | S.S.W. | 109 | 1.0 | 14 | 6 A | 7 A | 10 A | .01 | |

**Rain or melted snow at base of tower.

*Included in following day.

## REMARKS

The weather during May was generally seasonable and well adapted to plant growth. A large amount of sunshine and some high temperature, especially during the first part of the mouth, gave vegetation a good start on the season's growth. While the precipitation record was rather small, the ground seemed to be fairly well supplied with moisture for starting the crops. The entire absence of any frost during the month was an especially favorable feature.

The records of the several weather elements show the following features of interest: The mean barometer was considerably higher than the normal and the range was large for May. The maximum barometer was higher than usual while the minimum was about the normal value. The total wind movement was a little more than the normal and was from the south more than one-half the time. Only a few gales were recorded and they were of little intensity.

The mean temperature wns more than four degrees above the normal and the minimum fell below 40 degrees on only three dates. While frost was reported on a few dates in low places, there was none noted at the station. The maximum temperature was practically normal.

The mean dew point and relative humidity were both higher than their average values. The total precipitation was more than an inch less than the normal amount. That which occurred, however, was fairly well distributed throughout the month.

The amount of sunshine was large, but the last week was rather cloudy.

J. E. OSTRANDER, Meteorologist.

A. L. CHANDLER, Observer.

NOTE—The regular observations at this station are continued at 8 A. M. and 8 P. M. *75th meridian time.*

BULLETIN No. 354. JUNE, 1918

# Meteorological Observations
AT THE
# MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.
*Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.*
*Height of Wind Instruments 72 ft. Time used, 75th Mer.*

## MONTHLY SUMMARY.

**Pressure.** In inches.

| | |
|---|---|
| Maximum reduced to freezing, | 29.94, 20th, 8 A |
| Minimum reduced to freezing, | 29.02, 12th, 3 P |
| Reduced maximum reading | 30.24, 20th, 8 A |
| Reduced† minimum reading, | 29.31, 12th, 3 P |
| Mean semi-daily reduced | 29.920 |
| Monthly range | 0.93 |

***Air Temperature.** In Degrees Fahr.

| | |
|---|---|
| Highest | 93.0, 1st, 3:30 P. |
| Lowest | 40.0, 20th, 5 A; 21st, 5:30 A |
| Mean hourly | 62.9 |
| Mean of means of max. and min. | 63.0 |
| Mean sensible (wet bulb) | 57.3 |
| Monthly range | 53.0 |
| Highest mean daily | 79.8, 2d |
| Lowest mean daily | 51.2, 23d |
| Mean maximum | 75.0 |
| Mean minimum | 51.0 |
| Mean daily range | 24.0 |
| Greatest daily range | 41.0, 16th |
| Least daily range | 6.0, 23d |

**Humidity.**

| | |
|---|---|
| Mean dew point | 53.3 |
| Mean force of vapor | .581 |
| Mean relative humidity | 72.9 |

**Precipitation.** In inches.

| | |
|---|---|
| Total precipitation, in inches | 4.01 |
| Number of days on which .01 inch or more rain fell | 9 |

**Wind.**

| | |
|---|---|
| Total movement | 3858 m |
| Greatest daily movement | 332m, 7th |
| Least daily movement | 24m, 25th |
| Mean daily movement | 129 m |
| Mean hourly velocity | 5.4 m |

Maximum pressure per square foot, 4.5 lbs = 30m per hour, 3d, 6 P, N.W.; 7th, 5:30 P, S.
Maximum velocity for 5 minutes, 24m per hour, 3d, 6 P, N.W.
Prevailing direction, West Southwest.

Summary.

| | |
|---|---|
| South | 23 per cent |
| Northwest | 13 " " |
| South Southwest | 13 " " |
| West | 10 " " |
| North Northwest | 10 " " |
| Other directions | 31 " " |

**Weather.**

| | |
|---|---|
| Mean cloudiness observed | 45 per cent |
| Total cloudiness recorded by the Sun Thermometer | 192 hours = 42 per cent |
| Number of clear days | 9 |
| Number of fair days | 13 |
| Number of cloudy days | 8 |

**Bright Sunshine.**
Number hours recorded, 265 hrs, = 58 per cent

**Rain.** 4th, 6th, 7th, 9th, 10th, 12th, 13th, 17th, 21st, 22d, 23d.

**Thunder and Lightning.** 6th, 12th.

**Gales.** 35 miles or more per hour : None

---

*Temperature in ground shelter.

**Reduced to freezing and sea-level.

# DAILY SUMMARY.

| Day. | Barometer Reduced to Sea Level. | | | Temperature. Ground Shelter. | | | | | | | No. Hours of Bright Sunshine |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Maximum | Minimum. | Mean. Semi-daily | Maximum | Time. | Minimum. | Time. | Mean of Max. and Min. | Mean Hourly Draper. | Mean Sensible Wet Bulb. | |
| 1 | 29.89 | 29.72 | 29.789 | 93.0 | 3:30 P | 60.0 | 5 A | 77.5 | 76.7 | 69.3 | 10.3 |
| 2 | 29.92 | 29.77 | 29.875 | 89.0 | 3:30 P | 68.0 | 11:30 P | 78.5 | 79.8 | 69.7 | 12.1 |
| 3 | 30.03 | 29.92 | 29.972 | 81.0 | 4 P | 62.0 | 5:30 A | 71.5 | 72.4 | 64.3 | 13.0 |
| 4 | 30.17 | 30.03 | 30.171 | 78.5 | 2 P | 52.0 | 5:30 A | 65.3 | 63.5 | 56.7 | 9.7 |
| 5 | 30.20 | 30.13 | 30.195 | 77.5 | 3 P | 51.0 | 6 A | 64.3 | 63.9 | 58.3 | 11.0 |
| 6 | 30.20 | 29.98 | 30.119 | 72.0 | 0:30 P | 58.0 | 5 A | 65.0 | 65.7 | 62.5 | 2.7 |
| 7 | 29.98 | 29.67 | 29.768 | 70.5 | 2 P | 57.0 | 12 P | 63.7 | 65.8 | 57.0 | 7.0 |
| 8 | 30.06 | 29.90 | 30.031 | 73.5 | 4 P | 50.0 | 4 A | 61.7 | 59.9 | 53.5 | 12.4 |
| 9 | 30.07 | 29.97 | 30.022 | 77.0 | 1 P | 45.0 | 3 A | 61.0 | 62.8 | 57.5 | 7.5 |
| 10 | 30.03 | 29.94 | 29.971 | 68.0 | 1 P | 54.0 | 12 P | 61.0 | 60.6 | 57.7 | 2.9 |
| 11 | 30.03 | 29.71 | 29.898 | 75.5 | 1:30 P | 54.0 | 0:30 A | 63.7 | 62.5 | 57.5 | 10.5 |
| 12 | 29.71 | 29.31 | 29.425 | 73.0 | 2 P | 55.5 | 1 A | 64.3 | 61.9 | 57.7 | 0.9 |
| 13 | 29.67 | 29.46 | 29.559 | 64.0 | 6 P | 52.0 | 12 P | 58.0 | 57.1 | 51.7 | 4.3 |
| 14 | 29.84 | 29.67 | 29.719 | 72.0 | 3 P | 48.5 | 3:30 A | 60.3 | 60.2 | 54.5 | 10.7 |
| 15 | 30.13 | 29.84 | 29.957 | 74.0 | 4 P | 44.0 | 5 A | 59.0 | 61.3 | 58.5 | 13.5 |
| 16 | 30.20 | 30.09 | 30.155 | 82.0 | 5 P | 41.0 | 5:30 A | 61.5 | 63.7 | 59.0 | 13.5 |
| 17 | 30.10 | 29.87 | 29.962 | 82.0 | 1 P | 53.5 | 5 A | 67.7 | 67.6 | 60.7 | 9.0 |
| 18 | 30.00 | 29.93 | 29.988 | 76.5 | 3 P | 50.0 | 12 P | 63.3 | 64.1 | 53.3 | 13.5 |
| 19 | 30.18 | 29.97 | 30.074 | 74.5 | 3 P | 42.0 | 5 A | 58.3 | 58.0 | 49.3 | 10.7 |
| 20 | 30.24 | 30.14 | 30.199 | 70.0 | 4:30 P | 40.0 | 5 A | 55.0 | 55.8 | 47.3 | 13.0 |
| 21 | 30.21 | 29.82 | 30.050 | 69.0 | 3:30 P | 40.0 | 5:30 A | 54.5 | 55.2 | 50.3 | 11.5 |
| 22 | 29.82 | 29.42 | 29.451 | 64.0 | 6 P | 52.0 | 0 A | 58.0 | 57.2 | 55.0 | 3.1 |
| 23 | 29.68 | 29.43 | 29.565 | 55.0 | 2 P | 49.0 | 12 P | 52.0 | 51.2 | 48.0 | 2.6 |
| 24 | 29.94 | 29.68 | 29.825 | 74.0 | 3 P | 46.5 | 3 A | 60.3 | 60.6 | 58.5 | 9.8 |
| 25 | 29.97 | 29.92 | 29.946 | 77.0 | 3 P | 47.0 | 5:30 A | 62.0 | 61.3 | 57.5 | 7.5 |
| 26 | 30.08 | 29.96 | 29.994 | 77.0 | 2:30 P | 49.0 | 6 A | 63.0 | 63.6 | 57.3 | 12.5 |
| 27 | 30.08 | 30.05 | 30.067 | 74.0 | 3:30 P | 48.0 | 5 A | 61.0 | 61.2 | 54.7 | 12.7 |
| 28 | 30.10 | 29.95 | 30.030 | 72.0 | 3:30 P | 45.0 | 5 A | 58.5 | 59.2 | 55.7 | 3.0 |
| 29 | 29.97 | 29.90 | 29.943 | 74.5 | 3 P | 57.0 | 4 A | 65.7 | 63.6 | 60.3 | 6.0 |
| 30 | 30.03 | 29.74 | 29.885 | 89.0 | 3:30 P | 60.0 | 5 A | 74.5 | 71.5 | 66.5 | 7.8 |

# DAILY SUMMARY.

| Day. | Humidity. | | | Wind. | | | | | Precipitation. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Total in Inches. | |
| | Mean Dew Point. | Mean Force vapor. | Mean Relative Humidity. | Prevailing Direction. | Total Movement in Miles. | Maximum Pressure Per Square Ft | Miles per Hour. | Time. | Beginning. | Ending. | Rain.** | Snow. |
| 1 | 67.5 | .874 | 77.5 | S.S.W. | 100 | 1.0 | 14 | 3 P | | | | |
| 2 | 64.5 | 1 044 | 58.5 | N.W. | 179 | 2.0 | 20 | 2 P | | | | |
| 3 | 59.0 | .808 | 62.5 | W. | 193 | 4.5 | 30 | 6 P | | | | |
| 4 | 53.0 | .556 | 74.0 | W. | 113 | 3.5 | 26 | 0:30A | 7:30 P | 9 P | .02 | |
| 5 | 54.5 | .584 | 73.0 | S. | 37 | 0.0 | — | — | | | | |
| 6 | 60.0 | .606 | 77.5 | S. | 66 | 2.5 | 22 | 11 P | 1 P | 3 P | .04 | |
| 7 | 52.0 | .578 | 70.5 | W.S.W. | 332 | 4.5 | 30 | 5:30P | 6 A | 2 P | .69 | |
| 8 | 49.5 | .493 | 71.5 | N. | 196 | 2.0 | 20 | 10 A | | | | |
| 9 | 53.5 | .580 | 71.5 | S. | 42 | 0.5 | 10 | 12 M | 7:30 P | | T | |
| 10 | 56 0 | .526 | 85.5 | N.N.E. | 59 | 0.0 | — | — | 4 A | 7:30 A | .06 | |
| 11 | 54.5 | .555 | 76.5 | N.W. | 124 | 2.5 | 22 | 4 P | | | | |
| 12 | 56 0 | .531 | 85.0 | W. | 248 | 2.5 | 22 | 11 A | 5 A | 12 P | .69 | |
| 13 | 48.5 | .448 | 75.5 | N.N.W. | 196 | 2.0 | 20 | 10 A | 11 P | 12 P | T | |
| 14 | 50.5 | .520 | 71.5 | S.W. | 151 | 2.5 | 22 | 2 P | | | | |
| 15 | 53.5 | .627 | 65.5 | N.W. | 122 | 2.0 | 20 | 1 P | | | | |
| 16 | 55.0 | .608 | 71.0 | S. | 74 | 4.0 | 28 | 3 P | | | | |
| 17 | 56.0 | .685 | 66.5 | S. | 200 | 2.5 | 22 | 2 P | 8:30 P | 9 P | .03 | |
| 18 | 45.5 | .548 | 57.0 | N.N.E. | 135 | 1.0 | 14 | 9 A | | | | |
| 19 | 40.0 | .495 | 51.0 | N.E. | 115 | 1.5 | 17 | 8 A | | | | |
| 20 | 37.0 | .455 | 49.5 | S. | 112 | 0.5 | 10 | 10 A | | | | |
| 21 | 45 0 | .445 | 67.0 | S. | 167 | 4.0 | 28 | 6 P | 7 P | 12 P | .25 | |
| 22 | 53.5 | .462 | 90 0 | N.N.W. | 104 | 1.0 | 14 | 8 P | 0 A | 10 A | 2.18 | |
| 23 | 45.5 | .362 | 85 0 | N.W. | 173 | 2.0 | 20 | 3 P | 8:30 A | 6 P | .05 | |
| 24 | 55 0 | .575 | 76.5 | N.N.W. | 116 | 1.5 | 17 | 12 P | | | | |
| 25 | 55.5 | .519 | 85.0 | S.S.W. | 24 | 0.0 | — | — | | | | |
| 26 | 53.5 | .552 | 75 0 | E.S E. | 85 | 0.5 | 10 | 4 P | | | | |
| 27 | 51.0 | .512 | 74 0 | N.E. | 101 | 1.0 | 14 | 1 P | | | | |
| 28 | 53 5 | .515 | 82 0 | S.E. | 62 | 1.0 | 14 | 3 P | | | | |
| 29 | 58.5 | .585 | 83.5 | S.S.W. | 174 | 2.0 | 20 | 4 P | | | | |
| 30 | 63.5 | .786 | 77.0 | S.S.W. | 59 | 0.5 | 10 | 4 A | | | | |

**Rain or melted snow at base of tower. *Included in following day.

## REMARKS

The effect of the weather during June on growing crops was somewhat disappointing. While the amount of sunshine was ample, the temperature was considerably below the normal. The first three days were the warmest of the month, and the last third of the month was the coolest period. The month was too dry for vegetation up to the 22d when a very heavy rainfall was recorded, which materially improved the moisture in the soil.

A summary of the various weather features shows the following features of more or less interest: The mean barometer was below the normal and the range of pressure was larger than usual. Although there were two periods of low barometer, the total wind movement was but little more than the normal and not a single gale was registered on the wind pressure chart. Most of the wind was from the westerly points of the compass.

The mean temperature was three degrees below the normal, and only four days had a mean hourly temperature above 70 degrees. The maximum temperature was slightly higher than the normal and occurred on the first day of the month. The minimum temperature was practically normal and no frost was noted at this station. The minimum thermometer however registered below 50 degrees on nearly one half the days of the month.

The mean dew point was more than three degrees lower than usual, and the relative humidity was practically normal.

The total precipitation was nearly one-fourth more than usual, due to the storm of the 22d. The other rains of the month were mostly of but small amounts.

The amount of cloudiness was less than usual.

J. E. OSTRANDER, Meteorologist.

G. A. SMITH, Acting Observer.

**BULLETIN No. 355. JULY, 1918**

# Meteorological Observations
AT THE
# MASSACHUSETTS
# AGRICULTURAL EXPERIMENT
# STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.
*Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.*
*Height of Wind Instruments 72 ft. Time used, 75th Mer.*

## MONTHLY SUMMARY.

### Pressure. In inches.

| | |
|---|---|
| Maximum reduced to freezing | 29.93, 25th, 8 A |
| Minimum reduced to freezing | 29.40, 9th, 1 P |
| Reduced maximum reading | 30.22, 25th, 8 A |
| Reduced† minimum reading, | 29.69, 9th, 1 P |
| Mean semi-daily reduced | 29.967 |
| Monthly range | 0.53 |

### *Air Temperature. In Degrees Fahr.

| | |
|---|---|
| Highest | 99.5, 22d, 5 P. |
| Lowest | 45.0, 3d, 5 A. |
| Mean hourly | 70.1 |
| Mean of means of max. and min. | 71.1 |
| Mean sensible (wet bulb) | 64.3 |
| Monthly range | 54.5 |
| Highest mean daily | 81.2, 23d |
| Lowest mean daily | 62.0, 2d |
| Mean maximum | 83.4 |
| Mean minimum | 58.8 |
| Mean daily range | 24.6 |
| Greatest daily range | 38.5, 22d |
| Least daily range | 12.0, 1st |

### Humidity.

| | |
|---|---|
| Mean dew point | 60.5 |
| Mean force of vapor | .737 |
| Mean relative humidity | 74.5 |

### Precipitation. In inches.

| | |
|---|---|
| Total precipitation, in inches | 1.84 |
| Number of days on which .01 inch or more rain fell | 6 |

### Wind.

| | |
|---|---|
| Total movement | 3093 m |
| Greatest daily movement | 240m, 30th |
| Least daily movement | 18m, 19th |
| Mean daily movement | 100 m |
| Mean hourly velocity | 4.2 m |

Maximum pressure per square foot, 5.0 lbs = 32m per hour, 29th, 6 P, S.S.W.

Maximum velocity for 5 minutes, 24m per hour, 29th, 6 P, S.S.W.

Prevailing direction, Southwest.

### Summary.

| | |
|---|---|
| South | 16 per cent. |
| North | 16 " " |
| South Southwest | 16 " " |
| Southwest | 10 " " |
| North Northeast | 10 " " |
| Other directions | 32 " " |

### Weather.

| | |
|---|---|
| Mean cloudiness observed | 44 per cent |
| Total cloudiness recorded by the Sun Thermometer | 176 hours = 38 per cent |
| Number of clear days | 7 |
| Number of fair days | 19 |
| Number of cloudy days | 5 |

### Bright Sunshine.

Number hours recorded, 286 hrs, = 62 per cent

**Rain**, 1st, 4th, 6th, 9th, 10th, 13th, 17th, 30th.

**Thunder and Lightning**, 10th, 14th, 15th, 17th, 30th.

**Gales**, 35 miles or more per hour : None

*Temperature in ground shelter.

**Reduced to freezing and sea-level.

# DAILY SUMMARY.

| Day. | Barometer Reduced to Sea Level. | | | Temperature. Ground Shelter. | | | | | | | No. Hours of Bright Sunshine |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Maximum | Minimum. | Mean. Semi-daily | Maximum | Time. | Minimum. | Time. | Mean of Max. and Min. | Mean Hourly Draper. | Mean Sensible Wet Bulb. | |
| 1 | 29.95 | 29.80 | 29.828 | 76.0 | 0:30 P | 64.0 | 5 A | 70.0 | 68.0 | 65.0 | 1.9 |
| 2 | 30.02 | 29.82 | 29.910 | 71.0 | 3 P | 51.0 | 12 P | 61.0 | 62.0 | 55.0 | 10.2 |
| 3 | 30.09 | 30.02 | 30.081 | 81.0 | 6 P | 45.0 | 5 A | 63.0 | 63.1 | 53.5 | 13.0 |
| 4 | 30.14 | 30.06 | 30.100 | 83.0 | 4 P | 56.0 | 2 A | 69.5 | 68.6 | 60.7 | 10.2 |
| 5 | 30.10 | 29.92 | 29.990 | 84.0 | 2 P | 61.0 | 5:30 A | 72.5 | 72.1 | 64.7 | 12.0 |
| 6 | 29.96 | 29.83 | 29.875 | 73.5 | 4:30 P | 60.0 | 12 P | 66.7 | 66.5 | 64.7 | 7.9 |
| 7 | 29.86 | 29.73 | 29.770 | 77.0 | 3:30 P | 57.0 | 12 P | 67.0 | 66.2 | 59.7 | 10.6 |
| 8 | 29.80 | 29.72 | 29.754 | 70.0 | 4 P | 52.0 | 5 A | 61.0 | 60.7 | 55.5 | 9.0 |
| 9 | 29.75 | 29.69 | 29.722 | 72.0 | 12 M | 52.0 | 5 A | 62.0 | 60.6 | 57.5 | 4.4 |
| 10 | 29.94 | 29.75 | 29.868 | 79.5 | 2:30 P | 56.0 | 5 A | 67.7 | 67.1 | 62.5 | 9.0 |
| 11 | 29.99 | 29.91 | 29.954 | 81.5 | 4 P | 51.0 | 5:30 A | 66.3 | 67.5 | 61.7 | 10.2 |
| 12 | 30.01 | 29.95 | 30.002 | 80.0 | 4 P | 56.0 | 5 A | 68.0 | 68.0 | 62.3 | 12.2 |
| 13 | 30.03 | 29.96 | 30.027 | 78.0 | 5 P | 56.0 | 5 A | 67.0 | 65.3 | 62.5 | 6.2 |
| 14 | 29.98 | 29.90 | 29.974 | 77.5 | 4 P | 57.0 | 12 P | 67.3 | 65.4 | 61.7 | 3.6 |
| 15 | 30.05 | 29.94 | 29.978 | 85.0 | 5:30 P | 53.0 | 4 A | 69.0 | 67.7 | 65.7 | 10.0 |
| 16 | 30.04 | 29.90 | 29.986 | 90.5 | 2:30 P | 53.0 | 5 A | 71.7 | 71.5 | 60.5 | 11.5 |
| 17 | 29.90 | 29.77 | 29.817 | 80.0 | 11:30 A | 62.0 | 5 A | 71.0 | 67.7 | 65.3 | 4.7 |
| 18 | 29.85 | 29.77 | 29.792 | 84.5 | 5 P | 61.5 | 5 A | 73.0 | 72.2 | 68.7 | 12.5 |
| 19 | 29.91 | 29.83 | 29.868 | 89.0 | 3 P | 56.5 | 5:30 A | 72.7 | 71.8 | 65.0 | 11.0 |
| 20 | 30.06 | 29.91 | 29.984 | 90.0 | 4 P | 59.0 | 5 A | 74.5 | 73.3 | 64.7 | 12.5 |
| 21 | 30.12 | 30.06 | 30.095 | 95.5 | 3:30 P | 57.5 | 5 A | 76.5 | 74.6 | 65.7 | 12.7 |
| 22 | 30.15 | 30.07 | 30.118 | 99.5 | 5 P | 61.0 | 6 A | 80.3 | 80.0 | 68.7 | 12.0 |
| 23 | 30.10 | 29.97 | 30.042 | 96.0 | 2:30 P | 66.5 | 5 A | 81.3 | 81.2 | 73.0 | 11.8 |
| 24 | 30.19 | 30.04 | 30.136 | 84.0 | 2 P | 67.0 | 5 A | 75.5 | 74.3 | 67.3 | 7.0 |
| 25 | 30.22 | 30.16 | 30.203 | 83.0 | 3:30 P | 65.0 | 2 A | 74.0 | 71.3 | 66.0 | 9.5 |
| 26 | 30.21 | 30.11 | 30.163 | 87.0 | 3 P | 66.0 | 4 A | 76.5 | 74.4 | 68.3 | 9.5 |
| 27 | 30.15 | 30.03 | 30.098 | 94.0 | 3 P | 65.0 | 5 A | 79.5 | 77.9 | 70.0 | 11.5 |
| 28 | 30.08 | 30.00 | 30.041 | 96.5 | 3 P | 68.5 | 5 A | 82.5 | 80.6 | 74.5 | 11.5 |
| 29 | 30.04 | 29.90 | 29.977 | 91.0 | 3 P | 68.0 | 4 A | 79.5 | 78.2 | 71.7 | 9.0 |
| 30 | 29.91 | 29.87 | 29.888 | 79.0 | 9 A | 63.0 | 12 P | 71.0 | 70.0 | 66.7 | 0.6 |
| 31 | 29.95 | 29.90 | 29.925 | 76.5 | 3:30 P | 57.0 | 5 A | 66.7 | 65.8 | 66.0 | 8.7 |

# DAILY SUMMARY.

| Day. | Humidity. | | | Wind. | | | | | Precipitation. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Total in Inches. | |
| | Mean Dew Point. | Mean Force vapor. | Mean Relative Humidity. | Prevailing Direction. | Total Movement in Miles. | Maximum Pressure Per Square Ft | Miles per Hour. | Time. | Beginning. | Ending. | Rain.** | Snow. |
| 1 | 63.0 | .679 | 85.0 | S.S.W. | 189 | 2.5 | 22 | 1 P | 2 P | 5:30 P | .11 | |
| 2 | 51.0 | .521 | 73.0 | N.N.W. | 123 | 1.5 | 17 | 5 P | | | | |
| 3 | 45.5 | .581 | 53.0 | N. | 65 | 0.0 | — | — | | | | |
| 4 | 55.0 | .700 | 62.5 | N.N.E. | 97 | 1.0 | 14 | 1 A | 1:30 A | 2:30 A | T | |
| 5 | 58.5 | .838 | 60.5 | N.N.E. | 146 | 1.5 | 17 | 10 A | | | | |
| 6 | 61.5 | .707 | 79.5 | E. | 90 | 0.0 | — | — | 0:30 P | 1:30 P | T | |
| 7 | 55.0 | .660 | 71.0 | N.W. | 114 | 2.0 | 20 | 1 P | | | | |
| 8 | 52.0 | .525 | 74.3 | W.N.W. | 139 | 1.5 | 17 | 5 P | | | | |
| 9 | 55.0 | .557 | 78.0 | S.S.W. | 100 | 2.0 | 20 | 11 A | 7 P | 8 P | .02 | |
| 10 | 59.5 | .662 | 78.5 | S. | 127 | 1.5 | 17 | 3 P | 5 P | 6 P | .01 | |
| 11 | 57.5 | .694 | 69.5 | S.W. | 53 | 0.0 | — | — | | | | |
| 12 | 59.0 | .698 | 72.0 | N. | 74 | 0.5 | 10 | 1 P | | | | |
| 13 | 61.0 | .612 | 88.5 | N. | 52 | 0.0 | — | — | 5 P | 6 P | .04 | |
| 14 | 60.5 | .583 | 91.0 | N. | 28 | 0.5 | 10 | 1 P | | | | |
| 15 | 64.5 | .715 | 86.5 | S.E. | 39 | 0.0 | — | — | | | | |
| 16 | 56.0 | .672 | 67.0 | S. | 87 | 1.0 | 14 | 6 P | | | | |
| 17 | 63.5 | .676 | 88.0 | N.N.E. | 76 | 0.5 | 10 | 1 P | 2 P | 5 P | .21 | |
| 18 | 67.0 | .798 | 83.5 | N.W. | 78 | 0.0 | — | — | | | | |
| 19 | 61.5 | .742 | 75.5 | S.W. | 18 | 0.0 | — | — | | | | |
| 20 | 61.0 | .785 | 67.5 | N.N.W. | 67 | 0.0 | — | — | | | | |
| 21 | 62.5 | .763 | 74.5 | W.S.W. | 40 | 0.0 | — | — | | | | |
| 22 | 63.5 | 1.002 | 60.5 | S.S.W. | 21 | 0.0 | — | — | | | | |
| 23 | 69.5 | 1.035 | 70.0 | S.W. | 61 | 0.0 | — | — | | | | |
| 24 | 64.0 | .807 | 75.0 | E.S.E. | 85 | 0.0 | — | — | | | | |
| 25 | 64.0 | .718 | 84.5 | S.S.E. | 53 | 0.0 | — | — | | | | |
| 26 | 65.5 | .801 | 80.5 | S. | 123 | 0.5 | 10 | 3 P | | | | |
| 27 | 67.5 | .820 | 78.5 | S. | 162 | 2.5 | 22 | 1 P | | | | |
| 28 | 71.5 | 1.130 | 70.5 | S.S.W. | 162 | 2.5 | 22 | 7 P | | | | |
| 29 | 68.5 | .952 | 75.0 | S. | 233 | 5.0 | 32 | 6 P | | | | |
| 30 | 64.0 | .803 | 76.5 | S.S.W. | 240 | 3.0 | 24 | 6 A | 9:30 A | 5:30 P | 1.45 | |
| 31 | 49.0 | .603 | 58.5 | N. | 151 | 1.5 | 17 | 9 A | | | | |

**Rain or melted snow at base of tower. *Included in following day.

## REMARKS

The most noticeable features of the weather during July were the very light precipitation up to nearly the end of the month, and the large amount of sunshine. The drought, which had become quite pronounced, was broken on the 30th by a heavy shower, giving nearly one and one-half inches of water, and about eighty per cent of the total for the month.

The first half of the month was much cooler than the last half, when several very warm days occurred.

A comparison of the records of the several weather elements with their respective normals shows the following features of more or less interest. The mean barometer was practically normal and the range of pressure comparatively small. The total wind movement was about eighty per cent of the normal and many days of comparative calm were noted. More than the usual amount of wind was from the southerly points of the compass.

The mean temperature was practically normal and the range considerably more than the normal. The maximum temperature was about six degrees higher than the normal, and the minimum was about the average value for this feature. The difference between the mean hourly temperature and the mean of maximum and minimum temperatures was larger than usual.

The mean dew point was slightly below the normal and the mean relative humidity about a point higher than usual.

The total precipitation was about forty per cent of the normal and nearly all came in a single storm as noted above.

J. E. OSTRANDER, Meteorologist.

G. A. SMITH, Acting Observer.

BULLETIN No. 356. AUGUST, 1918

# Meteorological Observations
AT THE
# MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.
*Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.*
*Height of Wind Instruments 72 ft. Time used, 75th Mer.*

## MONTHLY SUMMARY.

**Pressure.** In inches.

| | |
|---|---|
| Maximum reduced to freezing, | 30.,19 19th, 9 A |
| Minimum reduced to freezing, | 29.44, 9th, 4 P |
| Reduced maximum reading | 30.48, 19th, 9 A |
| Reduced† minimum reading, | 29.72, 9th, 4 P |
| Mean semi-daily reduced | 30.027 |
| Monthly range | 0.76 |

***Air Temperature.** In Degrees Fahr.

| | |
|---|---|
| Highest | 100.0, 7th, 3 P. |
| Lowest | 44.0, 19th, 6 A.: 20th, 6 A. |
| Mean hourly | 70.5 |
| Mean of means of max. and min. | 71.6 |
| Mean sensible (wet bulb) | 63.9 |
| Monthly range | 56 0 |
| Highest mean daily | 81.7, 7th |
| Lowest mean daily | 60.9, 19th |
| Mean maximum | 84.5 |
| Mean minimum | 58.7 |
| Mean daily range | 25.8 |
| Greatest daily range | 42.5, 20th |
| Least daily range | 13.0, 29th |

**Humidity.**

| | |
|---|---|
| Mean dew point | 60.8 |
| Mean force of vapor | .724 |
| Mean relative humidity | 75.5 |

**Precipitation.** In inches.

| | |
|---|---|
| Total precipitation, in inches | 2.22 |
| Number of days on which .01 inch or more rain fell | 10 |

**Wind.**

| | |
|---|---|
| Total movement | 2583m |
| Greatest daily movement | 145m, 17th |
| Least daily movement | 24m 16th |
| Mean daily movement | 83 m |
| Mean hourly velocity | 3.5 m |

Maximum pressure per square foot, 6.5 lbs = 36m per hour, 14th, 3 P, S.W.
Maximum velocity for 5 minutes, 24m per hour, 14th, 3:30 P, S.W.
Prevailing direction, South.

Summary.

| | |
|---|---|
| South | 39 per cent. |
| South Southwest | 19 “ “ |
| Southwest | 10 “ “ |
| North Northeast | 10 “ “ |
| Other directions | 22 “ “ |

**Weather.**

| | |
|---|---|
| Mean cloudiness observed | 37 per cent |
| Total cloudiness recorded by the Sun Thermometer | 153 hours = 36 per cent |
| Number of clear days | 12 |
| Number of fair days | 12 |
| Number of cloudy days | 7 |

**Bright Sunshine.**

Number hours recorded, 276 hrs. = 64 per cent

**Rain.** 5th, 7th, 9th, 10th, 11th, 14th, 24th, 26th; 29th, 31st.

**Thunder and Lightning.** 2d, 9th, 14th, 24th, 26th, 31st.

**Gales.** 35 miles or more per hour : 36 m, 14th, S. W.

---

*Temperature in ground shelter.

**Reduced to freezing and sea-level.

# DAILY SUMMARY.

| Day. | Barometer Reduced to Sea Level. | | | Temperature. Ground Shelter. | | | | | | | No. Hours of Bright Sunshine |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Maximum | Minimum. | Mean. Semi-daily | Maximum | Time. | Minimum. | Time. | Mean of Max. and Min. | Mean Hourly Draper. | Mean Sensible Wet Bulb. | |
| 1 | 30.00 | 29.92 | 29.967 | 84.0 | 4:30 P | 58.0 | 5:30 A | 71.0 | 70.0 | 58.7 | 11.5 |
| 2 | 29.98 | 29.82 | 29 908 | 85.5 | 2:30 P | 58.0 | 4 A | 71.7 | 71.2 | 65.3 | 8.4 |
| 3 | 30.09 | 29.87 | 30.004 | 78.0 | 3:30 P | 54.5 | 12 P | 66.3 | 66.7 | 57.3 | 12.7 |
| 4 | 30.13 | 30.03 | 30.070 | 76.0 | 3 P | 50.5 | 3 A | 63.3 | 63.3 | 58.3 | 6.5 |
| 5 | 30.03 | 29.78 | 29.857 | 86.0 | 5 P | 59.0 | 3 A | 72.5 | 70.4 | 67.3 | 6.7 |
| 6 | 29.90 | 29.83 | 29.886 | 96.0 | 3:30 P | 69.0 | 6 A | 82.5 | 80.4 | 72.5 | 10.7 |
| 7 | 29 98 | 29 81 | 29.844 | 100.0 | 3 P | 68.5 | 5:30 A | 84.3 | 81.7 | 71.3 | 10.2 |
| 8 | 29.87 | 29 83 | 29.853 | 86.5 | 5 P | 72.5 | 5 A | 79.5 | 79.5 | 72.0 | 6.3 |
| 9 | 29.94 | 29 72 | 29 780 | 80.5 | 3:30 P | 66.0 | 12 P | 73.3 | 73 1 | 67.5 | 4.8 |
| 10 | 30.15 | 29.94 | 30.117 | 79.0 | 1 P | 59.0 | 12 P | 69.0 | 64.7 | 61.3 | 2.1 |
| 11 | 30.12 | 30.01 | 30 068 | 71.0 | 3 P | 57.0 | 5:30 A | 64.0 | 63.9 | 63.0 | 5.2 |
| 12 | 30.03 | 29.97 | 30 000 | 87.5 | 5 P | 67.0 | 5 A | 77.3 | 75.3 | 71.7 | 8.3 |
| 13 | 30.05 | 29.91 | 29.995 | 93.0 | 3 P | 59.5 | 6 A | 76.3 | 77.2 | 71.3 | 11.0 |
| 14 | 29.93 | 29.77 | 29.894 | 95.0 | 2:30 P | 70.0 | 12 P | 82.5 | 79 4 | 71.7 | 7.9 |
| 15 | 30.04 | 29.90 | 30.024 | 84.5 | 4 P | 58.0 | 6 A | 71.3 | 70.5 | 61.7 | 12.8 |
| 16 | 30.02 | 29.92 | 29.975 | 87.0 | 3 P | 52.5 | 5 A | 69.7 | 68.9 | 61.3 | 11.3 |
| 17 | 30.27 | 30.01 | 30.136 | 74.5 | 4 P | 52.5 | 6 A | 63 5 | 64 9 | 60.0 | 12.5 |
| 18 | 30.40 | 30.27 | 30.322 | 77.0 | 5 P | 47.5 | 6 A | 61.7 | 61.3 | 52.5 | 11.8 |
| 19 | 30.48 | 30.33 | 30.409 | 78.5 | 5:30 P | 44.0 | 6 A | 61.3 | 60.9 | 53.0 | 12.7 |
| 20 | 30.38 | 30.22 | 30.298 | 86.5 | 4:30 P | 44.0 | 6 A | 65.3 | 64.5 | 55.3 | 12.1 |
| 21 | 30.24 | 30 01 | 30.115 | 87.0 | 4 P | 48.0 | 6 A | 67.5 | 68.0 | 60.3 | 11.8 |
| 22 | 30.07 | 29 94 | 29.983 | 92.5 | 4 P | 63 0 | 6 A | 77.7 | 76.5 | 67.7 | 11.0 |
| 23 | 30.04 | 29.92 | 29.985 | 95.0 | 4 P | 59.5 | 3:30 A | 77.3 | 75.1 | 68.3 | 8.7 |
| 24 | 29.98 | 29.89 | 29.945 | 84.0 | 2:30 P | 66.5 | 6 A | 75.3 | 73.4 | 68.5 | 5.3 |
| 25 | 29.97 | 29 89 | 29 938 | 93 0 | 3 P | 66.0 | 5 A | 79.5 | 76.5 | 69.0 | 10.0 |
| 26 | 29.91 | 29.77 | 29.868 | 86.0 | 1 P | 67.0 | 11 P | 76.5 | 73.5 | 68.7 | 3.0 |
| 27 | 30.29 | 29 86 | 30.178 | 82.0 | 3 P | 55.0 | 12 P | 68.5 | 68.5 | 56.7 | 12.1 |
| 28 | 30.41 | 30.30 | 30.374 | 80.0 | 3 P | 46.0 | 6 A | 63.0 | 62.8 | 56.0 | 11.5 |
| 29 | 30.30 | 29.99 | 30.059 | 69.0 | 4 P | 56 0 | 0 A | 62.5 | 63.8 | 63.3 | 0.8 |
| 30 | 30.06 | 29.98 | 30.018 | 82 5 | 4 P | 59 0 | 6 A | 70 7 | 70.2 | 64.3 | 11.3 |
| 31 | 30.06 | 29.85 | 29.969 | 82 0 | 3 P | 65 5 | 5:30 A | 73.7 | 70.1 | 65.7 | 5.0 |

# DAILY SUMMARY.

| Day. | Humidity. | | | Wind. | | | | | Precipitation. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Total in Inches. | |
| | Mean Dew Point. | Mean Force vapor. | Mean Relative Humidity. | Prevailing Direction. | Total Movement in Miles. | Maximum Pressure Per Square Ft | Miles per Hour. | Time. | Beginning. | Ending. | Rain.** | Snow. |
| 1 | 54.0 | .637 | 64.5 | S.S.W. | 73 | 1.0 | 14 | 9 P | | | | |
| 2 | 63.5 | .732 | 79.0 | S. | 122 | 2.0 | 20 | 1 P | | | | |
| 3 | 51.0 | .638 | 58.0 | N.N.E. | 135 | 1.0 | 14 | 9 P | | | | |
| 4 | 49.5 | .566 | 62.5 | S.S.W. | 116 | 3.0 | 24 | 2 P | | | | |
| 5 | 66.5 | .739 | 89.5 | S. | 77 | 1.5 | 17 | 0 A | 1 A | 3 A | .02 | |
| 6 | 70.5 | .954 | 78.5 | S.W. | 33 | 0.0 | — | — | | | | |
| 7 | 69.5 | .949 | 75.0 | S.W. | 83 | 2.0 | 20 | 4 P | 5:30 A | 7:30 A | .06 | |
| 8 | 69.0 | .999 | 71.5 | W. | 58 | 0.5 | 10 | 3 P | | | | |
| 9 | 66.5 | .756 | 84.5 | E. | 72 | 0.5 | 10 | 5 P | 4 A | 2:30 P | .26 | |
| 10 | 60.0 | .588 | 87.5 | E. | 86 | 0.5 | 10 | 1 A | 7:30 P | 12 P | .32 | |
| 11 | 62.5 | .614 | 92.5 | S. | 29 | 0.0 | — | — | 0 A | 3:30 A | .16 | |
| 12 | 71.0 | .850 | 89.5 | S. | 63 | 0.0 | — | — | | | | |
| 13 | 70.0 | .901 | 80.5 | S. | 80 | 1.5 | 17 | 4 P | | | | |
| 14 | 70.5 | .975 | 79.5 | S. | 124 | 6.5 | 36 | 3 P | 3:30 P | 5 P | .39 | |
| 15 | 57.5 | .714 | 67.0 | S.E. | 68 | 0.5 | 10 | 6 P | | | | |
| 16 | 58.0 | .658 | 73.5 | S.S.W. | 24 | 0.0 | — | — | | | | |
| 17 | 54.5 | .711 | 61.0 | N.N.E. | 145 | 2.0 | 20 | 12 M | | | | |
| 18 | 45.0 | .538 | 56.0 | N.E. | 92 | 0.0 | — | — | | | | |
| 19 | 47.0 | .519 | 63.5 | N. | 58 | 0.0 | — | — | | | | |
| 20 | 50.0 | .571 | 64.0 | S. | 39 | 0.0 | — | — | | | | |
| 21 | 57.0 | .650 | 75.0 | S.W. | 95 | 1.5 | 17 | 2 P | | | | |
| 22 | 63.0 | .893 | 66.5 | S. | 98 | 1.0 | 14 | 3 P | | | | |
| 23 | 66.5 | .720 | 84.0 | S.S.W. | 91 | 1.5 | 17 | 6 P | | | | |
| 24 | 66.5 | .810 | 79.5 | S. | 144 | 2.0 | 20 | 2 P | 2 P | 6 P | .05 | |
| 25 | 65.5 | .835 | 74.0 | S.S.W. | 40 | 1.0 | 14 | 5 P | | | | |
| 26 | 67.5 | .765 | 88.0 | S. | 68 | 2.0 | 20 | 3 P | 5:30 A | 2 P | .06 | |
| 27 | 53.5 | .598 | 68.0 | N.N.E. | 119 | 2.5 | 22 | 8 A | | | | |
| 28 | 51.5 | .535 | 73.0 | S.S.W. | 107 | 2.5 | 22 | 5 P | | | | |
| 29 | 62.5 | .615 | 92.0 | S. | 67 | 0.0 | — | — | 7:30 A | 2 P | .49 | |
| 30 | 61.0 | .714 | 75.0 | N.N.W. | 44 | 0.0 | — | — | | | | |
| 31 | 64.5 | .703 | 87.0 | S. | 133 | 3.5 | 26 | 3 P | 3 P | 12 P | .41 | |

**Rain or melted snow at base of tower. *Included in following day.

## REMARKS

The weather during August was warmer than usual, the maximum daily temperature being above 80 degrees on more than three-fourths of the days, and above 90 degrees on seven days. Although high temperatures were frequent the relative humidity was below the normal, making the heat less oppressive. The month was much drier than shown by the precipitation record, owing to the fact that nearly one-half the total rainfall occurred when the month was nearly over. The total precipitation was far from adequate, following the dry weather of the previous month. The prevalence of south wind was very unusual for this locality.

The records of the several weather elements show the following as the most important features of the records for the month. The mean barometer was slightly higher than the normal and the range more than usual. The maximum and minimum pressures were both higher than their respective normals. The total wind movement was about 600 miles less than the average and only one gale was recorded on the pressure chart.

The mean hourly temperature was more than two degrees above the normal and the maximum temperature of 100 degrees makes a new high record for August at this station. The maximum was nearly ten degrees above the normal value for this station. The minimum temperature was slightly higher than the normal, and was recorded on two successive mornings.

The mean dew point was slightly higher than the normal and the relative humidity about a point lower than usual.

The total precipitation was but little more than one-half the usual amount. While rain fell on ten dates most of the storms were of but little account.

The amount of bright sunshine was unusually large and the number of cloudy days small.

J. E. OSTRANDER, Meteorologist.

G. A. SMITH, Acting Observer.

BULLETIN No. 357. SEPTEMBER, 1918

# Meteorological Observations
AT THE
# MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.
*Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.*
*Height of Wind Instruments 72 ft. Time used, 75th Mer.*

## MONTHLY SUMMARY.

### Pressure. In inches.

| | |
|---|---|
| Maximum reduced to freezing, | 30.,12 11th, 8 A |
| Minimum reduced to freezing, | 29.40, 28th, 4 P |
| Reduced maximum reading | 30.42, 11th, 8 A |
| Reduced† minimum reading, | 29.69, 28th, 4 P |
| Mean semi-daily reduced | 30.029 |
| Monthly range | 0.73 |

### *Air Temperature. In Degrees Fahr.

| | |
|---|---|
| Highest | 84.0, 4th, 4 P. |
| Lowest | 34.5, 30th, 6 A. |
| Mean hourly | 57.6 |
| Mean of means of max. and min. | 58.0 |
| Mean sensible (wet bulb) | 53.2 |
| Monthly range | 48 5 |
| Highest mean daily | 71.6, 5th |
| Lowest mean daily | 47.8, 27th |
| Mean maximum | 69.1 |
| Mean minimum | 46.9 |
| Mean daily range | 22.2 |
| Greatest daily range | 38.0, 15th |
| Least daily range | 5.5, 26th |

### Humidity.

| | |
|---|---|
| Mean dew point | 50.3 |
| Mean force of vapor | .470 |
| Mean relative humidity | 81.3 |

### Precipitation. In inches.

| | |
|---|---|
| Total precipitation, in inches | 7.00 |
| Number of days on which .01 inch or more rain fell | 15 |

*Temperature in ground shelter.
**Reduced to freezing and sea-level.

### Wind.

| | |
|---|---|
| Total movement | 3271m |
| Greatest daily movement | 224m, 28th |
| Least daily movement | 30m, 15th |
| Mean daily movement | 109 m |
| Mean hourly velocity | 4.5 m |

Maximum pressure per square foot, 4.5 lbs = 30m per hour, 27th, 2 P, W.
Maximum velocity for 5 minutes, 24m per hour, 28th, 1:30 P, S.
Prevailing direction, West Southwest.

Summary.

| | |
|---|---|
| South | 13 per cent. |
| South Southwest | 20 " " |
| West | 17 " " |
| North | 10 " " |
| Southwest | 10 " " |
| North Northwest | 13 " " |
| Other directions | 17 " " |

### Weather.

| | |
|---|---|
| Mean cloudiness observed | 56 per cent |
| Total cloudiness recorded by the Sun Thermometer | 186 hours = 50 per cent |
| Number of clear days | 7 |
| Number of fair days | 12 |
| Number of cloudy days | 11 |

### Bright Sunshine.

Number hours recorded, 187 hrs, = 50 per cent
**Rain,** 1st, 6th, 7th, 8th, 9th, 12th, 13th, 17th, 18th, 20th, 21st, 23d, 26th, 27th, 30th.
**Thunder and Lightning,** 1st, 18th, 22d.
**Frosts,** 11th, 22d, 30th.
**Gales,** 35 miles or more per hour : None.

# DAILY SUMMARY.

| Day. | Barometer Reduced to Sea Level. | | | Temperature. Ground Shelter. | | | | | | | No. Hours of Bright Sunshine |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Maximum | Minimum. | Mean. Semi-daily | Maximum | Time. | Minimum. | Time. | Mean of Max. and Min. | Mean Hourly Draper. | Mean Sensible Wet Bulb. | |
| 1 | 30.13 | 29 86 | 30.019 | 79.5 | 4 P | 56.0 | 12 P | 67.7 | 67 1 | 59.5 | 11.1 |
| 2 | 30.23 | 30.13 | 30.202 | 81.0 | 4 P | 48.0 | 6 A | 64.5 | 65.1 | 59.7 | 11.7 |
| 3 | 30.20 | 30.11 | 30.154 | 78.0 | 4 P | 53.0 | 6 A | 65.5 | 63.6 | 58.3 | 10.0 |
| 4 | 30.15 | 30.06 | 30.110 | 84.0 | 4 P | 58.5 | 6 A | 71.3 | 69.5 | 64 5 | 8.1 |
| 5 | 30.08 | 29.85 | 29 929 | 82.0 | 3 P | 65.5 | 4 A | 73.7 | 71.6 | 65.5 | 8.1 |
| 6 | 29.89 | 29.84 | 29.824 | 72.0 | 3 P | 56.0 | 12 P | 64.0 | 65.1 | 61.7 | 1.4 |
| 7 | 30.12 | 29.88 | 30 053 | 67.5 | 4 P | 48.0 | 4 A | 57.7 | 56.0 | 51.0 | 6 2 |
| 8 | 30.16 | 30.09 | 30.131 | 61.5 | 3 P | 48.0 | 3 A | 54.7 | 54.7 | 53.5 | 1.1 |
| 9 | 30.20 | 30.11 | 30.173 | 76.5 | 4 P | 52.0 | 6 A | 64.3 | 62 3 | 57.0 | 11.0 |
| 10 | 30.34 | 30.15 | 30.236 | 72.5 | 3:30 P | 47.0 | 12 P | 59.7 | 60.2 | 52.3 | 9.3 |
| 11 | 30.42 | 30.23 | 30.344 | 68.0 | 5 P | 36.5 | 6 A | 52.3 | 52.4 | 46.7 | 11.4 |
| 12 | 30.26 | 30.05 | 30.146 | 69.0 | 3 P | 48.5 | 2 A | 58.7 | 56.7 | 52.0 | 5.5 |
| 13 | 30.05 | 29.86 | 29 888 | 69.0 | 5 P | 53 0 | 12 P | 61.0 | 57.7 | 55.7 | 3.0 |
| 14 | 30.00 | 29.90 | 29.962 | 65.5 | 2 P | 45.5 | 6 A | 55.5 | 55.5 | 51.5 | 6.0 |
| 15 | 30.03 | 29.91 | 29.990 | 77.0 | 4 P | 39.0 | 7 A | 58.0 | 56.7 | 47.3 | 10.0 |
| 16 | 30.00 | 29 94 | 29.984 | 72.0 | 1:30 P | 50.0 | 6 A | 61.0 | 62.0 | 57.7 | 1.5 |
| 17 | 30.09 | 29.92 | 30.010 | 75.5 | 1 P | 52.0 | 12 P | 63.7 | 64 6 | 60.0 | 2.5 |
| 18 | 30.10 | 29 78 | 29.936 | 53.5 | 6 P | 47.0 | 3:30 A | 50.3 | 51.6 | 50.5 | 0.0 |
| 19 | 29 97 | 29 84 | 29.955 | 77 0 | 3 P | 52.5 | 2 A | 64 7 | 62.8 | 57.7 | 7.4 |
| 20 | 29.95 | 29.88 | 29.856 | 70.0 | 11:30 A | 50 0 | 12 P | 60.0 | 61.2 | 59.7 | 2.0 |
| 21 | 30.08 | 29 83 | 29.962 | 61.0 | 6 P | 45.0 | 8 A | 53.0 | 50.5 | 45.5 | 6.3 |
| 22 | 30.25 | 30.08 | 30.239 | 59.0 | 3 P | 37.0 | 7 A | 48.0 | 48.7 | 45.3 | 7.0 |
| 23 | 30.29 | 30.18 | 30 244 | 66.5 | 3 P | 41.0 | 7 A | 53.7 | 54.0 | 50.5 | 8.7 |
| 24 | 30.18 | 30.02 | 30 090 | 63 0 | 4 P | 43.0 | 12 P | 53.0 | 52.0 | 49.0 | 2.2 |
| 25 | 30 22 | 30.10 | 30.164 | 61.0 | 3 P | 35.5 | 6 A | 48.3 | 48.0 | 45.7 | 4.3 |
| 26 | 30.10 | 29.85 | 29.926 | 53.5 | 0 A | 48.0 | 12 P | 50.7 | 51.1 | 50.5 | 0.0 |
| 27 | 29.95 | 29.87 | 29.920 | 59.0 | 3 P | 37.0 | 6 A | 48.0 | 47.8 | 42.3 | 4.5 |
| 28 | 29.93 | 29.69 | 29.812 | 72.0 | 3 P | 39 5 | 4:30 A | 55.7 | 56.1 | 50.0 | 9.6 |
| 29 | 29.96 | 29 72 | 29 794 | 65.0 | 3:30 P | 41.0 | 12 P | 53.0 | 54.6 | 49 3 | 9.5 |
| 30 | 30.20 | 29.96 | 30.135 | 63.0 | 3 P | 34 5 | 6 A | 48.7 | 50.0 | 47 0 | 7.3 |

# DAILY SUMMARY.

| Day. | Humidity. | | | Wind. | | | | | Precipitation. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Mean Dew Point. | Mean Force vapor. | Mean Relative Humidity. | Prevailing Direction. | Total Movement in Miles. | Maximum Pressure Per Square Ft | Miles per Hour. | Time. | Beginning. | Ending. | Total in Inches. | |
| | | | | | | | | | | | Rain.** | Snow. |
| 1 | 56.0 | .620 | 75.0 | N.N.W. | 149 | 2.0 | 20 | 9 A | 0 A | 3 A | .30 | |
| 2 | 56.5 | .664 | 76.0 | S.S.W. | 44 | 0.0 | — | — | | | | |
| 3 | 55.5 | .546 | 79.0 | S. | 85 | 1.0 | 14 | 3 P | | | | |
| 4 | 63.5 | .655 | 87.5 | S.S.W. | 67 | 0.5 | 10 | 2 P | | | | |
| 5 | 63.5 | .693 | 81.5 | S.S.W. | 175 | 3.5 | 26 | 10 A | | | | |
| 6 | 60.0 | .615 | 83.0 | N.W. | 113 | 0.0 | — | — | 8 A | 1 P | .23 | |
| 7 | 47.5 | .417 | 77.5 | N. | 99 | 1.0 | 14 | 10 A | 12 M | 1 P | .03 | |
| 8 | 51.5 | .438 | 86.5 | N.N.E. | 82 | 0.5 | 10 | 1 P | 10 A | 12 P | .31 | |
| 9 | 54.5 | .552 | 81.0 | N. | 93 | 0.5 | 10 | 1 P | 0 A | 1 A | .03 | |
| 10 | 48.5 | .453 | 75.5 | W. | 130 | 2.0 | 20 | 3 P | | | | |
| 11 | 40.5 | .390 | 65.5 | S.S.W. | 97 | 0.5 | 10 | 2 P | | | | |
| 12 | 50.0 | .424 | 86.0 | E.S.E. | 91 | 0.5 | 10 | 12 M | 7 P | 12 P | .26 | |
| 13 | 55.0 | .465 | 92.5 | N.N.W. | 80 | 0.0 | — | — | 0 A | 9 A | .41 | |
| 14 | 48.5 | .436 | 78.0 | W. | 87 | 1.0 | 14 | 1 P | | | | |
| 15 | 43.0 | .406 | 73.0 | S. | 30 | 0.0 | — | — | | | | |
| 16 | 55.5 | .551 | 80.5 | S. | 114 | 1.5 | 17 | 2 P | | | | |
| 17 | 57.5 | .585 | 82.5 | W. | 191 | 1.5 | 17 | 2 A | 4:30 A | 6 A | .02 | |
| 18 | 49.5 | .383 | 93.5 | N. | 70 | 0.0 | — | — | 7 A | 6 P | .66 | |
| 19 | 56.5 | .527 | 88.5 | S.S.E. | 163 | 3.0 | 24 | 3 P | | | | |
| 20 | 59.0 | .531 | 97.5 | N.N.W. | 80 | 0.5 | 10 | 11 P | 4:30 A | 12 P | .87 | |
| 21 | 42.5 | .338 | 81.5 | N.W. | 154 | 2.0 | 20 | 12 M | 0 A | 6 A | .27 | |
| 22 | 35.0 | .359 | 70.0 | W. | 92 | 2.5 | 22 | 3 P | | | | |
| 23 | 47.5 | .430 | 77.5 | S.W. | 104 | 1.0 | 14 | 11 A | 2 A | 4 A | .13 | |
| 24 | 47.5 | .365 | 91.5 | S.W. | 75 | 1.0 | 14 | 4 P | | | | |
| 25 | 44.5 | .337 | 90.5 | S.S.W. | 34 | 0.5 | 10 | 3 P | | | | |
| 26 | 49.5 | .375 | 95.0 | N.N.W. | 92 | 1.0 | 14 | 8 P | 1 A | 12 P | 3.17 | |
| 27 | 39.0 | .298 | 80.0 | S.W. | 178 | 4.5 | 30 | 2 P | 0 A | 5 A | .20 | |
| 28 | 44.0 | .452 | 64.5 | S. | 224 | 4.0 | 28 | 2 P | | | | |
| 29 | 45.0 | .413 | 72.5 | W. | 170 | 2.5 | 22 | 12 M | | | | |
| 30 | 42.5 | .372 | 75.0 | S.S.W. | 108 | 2.5 | 22 | 4 P | 6 P | 12 P | .11 | |

**Rain or melted snow at base of tower.

*Included in following day.

# REMARKS

The weather during September was less pleasant than usual owing to the large number of rainy days. The latter part of the month was comparatively cool, although freezing temperature was not reached at any time, and only a few light frosts were observed.

The total precipitation was unusually large, and the heavy storm of the 26th—27th showed a greater rainfail in 24 hours than had been noted for a number of years at this station. The observed cloudiness in the mornings was much greater than the amount noted in the evenings.

A comparison of the records of the several weather elements with their normals shows the following features of interest: The mean barometer was slightly lower than the normal and the range of pressure rather small. Change of pressure was generally slow. The maximum pressure for the month was practically normal, while the minimum was considerably higher than the normal.

The total wind movement was about the usual value and the wind directions were more variable than usual. Not a single gale was recorded on the pressure chart.

The maximum temperature came early in the month, and was not as high as the normal. The minimum temperature was registered on the last day of the month. The mean temperature was about three degrees below the normal, making it one of the coldest Septembers on our record.

The mean dew point was more than three degrees below the normal and the relative humidity about two points higher than usual, owing to the large amount of rainy weather.

The precipitation was about 70 per cent more than the normal and was well distributed throughout the month. The heavy downpour near the end of the month has been referred to above.

The amount of bright sunshine was considerably less than the usual amount.

J. E. OSTRANDER, Meteorologist.

E. M. BUFFUM, Acting Observer.

**BULLETIN No. 358. OCTOBER, 1918**

# Meteorological Observations
AT THE
# MASSACHUSETTS
# AGRICULTURAL EXPERIMENT
# STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.
*Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.*
*Height of Wind Instruments 72 ft. Time used, 75th Mer.*

## MONTHLY SUMMARY.

**Pressure.** In inches.

| | |
|---|---|
| Maximum reduced to freezing | 30.26, 19th, 8 A |
| Minimum reduced to freezing | 29.27, 13th, 4 P |
| Reduced maximum reading | 30.57, 19th, 8 A |
| Reduced† minimum reading | 29.56, 13th, 4 P |
| Mean semi-daily reduced | 30.118 |
| Monthly range | 1.01 |

***Air Temperature.** In Degrees Fahr.

| | |
|---|---|
| Highest | 78.5, 29th, 2 P. |
| Lowest | 27.5, 23d, 7:30A |
| Mean hourly | 52.6 |
| Mean of means of max. and min. | 53.1 |
| Mean sensible (wet bulb) | 47.8 |
| Monthly range | 51.0 |
| Highest mean daily | 67.2, 29th |
| Lowest mean daily | 42.4, 19th |
| Mean maximum | 65.2 |
| Mean minimum | 41.0 |
| Mean daily range | 24.2 |
| Greatest daily range | 41.5, 10th |
| Least daily range | 8.5, 30th |

**Humidity.**

| | |
|---|---|
| Mean dew point | 44.3 |
| Mean force of vapor | .389 |
| Mean relative humidity | 80.5 |

**Precipitation.** In inches.

| | |
|---|---|
| Total precipitation, in inches | 1.32 |
| Number of days on which .01 inch or more rain fell | 10 |

**Wind.**

| | |
|---|---|
| Total movement | 4297 m |
| Greatest daily movement | 312m, 31st |
| Least daily movement | 21m, 23d |
| Mean daily movement | 139 m |
| Mean hourly velocity | 5.8 m |

Maximum pressure per square foot, 10.5 lbs = 46m per hour, 20th, 4 P, S.
Maximum velocity for 5 minutes, 30m per hour, 6th, 2 P, W.S.W.
Prevailing direction, South Southwest.

Summary.

| | |
|---|---|
| South | 32 per cent. |
| South Southwest | 32 " " |
| Other directions | 36 " " |

**Weather.**

| | |
|---|---|
| Mean cloudiness observed | 52 per cent |
| Total cloudiness recorded by the Sun Thermometer | 161 hours = 47 per cent |
| Number of clear days | 8 |
| Number of fair days | 11 |
| Number of cloudy days | 12 |

**Bright Sunshine.**

Number hours recorded, 180 hrs, = 53 per cent

**Rain.** 2d, 3d, 5th, 6th, 12th, 20th, 26th, 28th, 30th, 31st.

**Thunder and Lightning.** 3d.

**Frosts.** 4th, 8th, 9th, 10th, 15th, 19th, 22d, 23d, 24th.

**Gales.** 35 miles or more per hour: 42 m, 6th, W.S.W.; 46 m, 20th, S

*Temperature in ground shelter.
**Reduced to freezing and sea-level.

# DAILY SUMMARY.

| Day. | Barometer Reduced to Sea Level. | | | Temperature. Ground Shelter. | | | | | | | No. Hours of Bright Sunshine |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Maximum | Minimum. | Mean. Semi-daily | Maximum | Time. | Minimum. | Time. | Mean of Max. and Min. | Mean Hourly Draper. | Mean Sensible Wet Bulb. | |
| 1 | 30.46 | 30.20 | 30.434 | 65.0 | 5 P | 38.0 | 6:30 A | 51.5 | 48.5 | 40.5 | 10.5 |
| 2 | 30.45 | 30.09 | 30.304 | 65.5 | 4 P | 34.0 | 4 A | 49.7 | 50.7 | 48.3 | 3.3 |
| 3 | 30.22 | 30.02 | 30.119 | 68.0 | 1:30 P | 44.0 | 12 P | 56.0 | 58.8 | 55.0 | 4.3 |
| 4 | 30.43 | 30.22 | 30.352 | 64.5 | 3:30 P | 36.0 | 6:30 A | 50.3 | 49.4 | 43.5 | 8.5 |
| 5 | 30.26 | 29.77 | 29.944 | 65.5 | 2 P | 44.0 | 1 A | 54.7 | 55.7 | 51.7 | 1.2 |
| 6 | 29.83 | 29.57 | 29.654 | 74.0 | 2 P | 46.0 | 12 P | 60.0 | 60.0 | 56.3 | 4.2 |
| 7 | 30.37 | 29.83 | 30.217 | 59.0 | 3:30 P | 38.5 | 12 P | 48.7 | 46.7 | 36.5 | 8.6 |
| 8 | 30.50 | 30.32 | 30.412 | 67.5 | 4 P | 30.5 | 7 A | 49.0 | 46.6 | 38.7 | 10.5 |
| 9 | 30.32 | 30.05 | 30.177 | 68.0 | 4 P | 30.5 | 7 A | 49.3 | 47.7 | 41.3 | 8.0 |
| 10 | 30.09 | 30.00 | 30.074 | 71.5 | 4 P | 30.0 | 7 A | 50.7 | 50.6 | 43.7 | 9.3 |
| 11 | 30.13 | 30.01 | 30.101 | 75.0 | 3 P | 41.0 | 5 A | 58.0 | 57.1 | 48.7 | 8.5 |
| 12 | 30.09 | 29.83 | 29.947 | 57.0 | 8 P | 45.0 | 6 A | 51.0 | 51.7 | 51.3 | 0.0 |
| 13 | 29.83 | 29.56 | 29.694 | 72.0 | 1:30 P | 53.0 | 4 A | 62.5 | 59.0 | 53.0 | 3.7 |
| 14 | 30.02 | 29.71 | 29.859 | 59.5 | 2:30 P | 41.0 | 12 P | 50.3 | 49.5 | 44.3 | 7.7 |
| 15 | 30.22 | 30.02 | 30.213 | 56.0 | 3 P | 33.5 | 6:30 A | 44.7 | 44.6 | 37.7 | 9.2 |
| 16 | 30.18 | 30.05 | 30.134 | 63.0 | 4 P | 40.0 | 12 P | 51.5 | 47.9 | 41.0 | 5.9 |
| 17 | 30.19 | 29.84 | 30.060 | 61.0 | 3 P | 35.0 | 7 A | 48.0 | 48.9 | 44.0 | 4.4 |
| 18 | 30.43 | 29.82 | 30.229 | 56.0 | 0 A | 35.0 | 12 P | 45.5 | 47.2 | 40.7 | 1.5 |
| 19 | 30.57 | 30.43 | 30.520 | 59.5 | 3 P | 29.0 | 6:30 A | 44.3 | 42.4 | 35.5 | 10.9 |
| 20 | 30.44 | 29.87 | 30.106 | 56.5 | 3 P | 34.0 | 4 A | 45.3 | 48.4 | 48.7 | 0.5 |
| 21 | 30.09 | 29.83 | 30.008 | 58.0 | 3:30 P | 38.0 | 12 P | 48.0 | 49.9 | 43.5 | 7.5 |
| 22 | 30.24 | 30.09 | 30.209 | 61.0 | 4 P | 32.5 | 4 A | 46.7 | 44.9 | 37.5 | 9.7 |
| 23 | 30.34 | 30.24 | 30.299 | 66.0 | 5 P | 27.5 | 7:30 A | 46.7 | 42.9 | 36.5 | 9.7 |
| 24 | 30.44 | 30.30 | 30.398 | 60.5 | 2:30 P | 29.0 | 7 A | 44.7 | 46.9 | 41.3 | 9.6 |
| 25 | 30.36 | 30.27 | 30.322 | 63.5 | 3 P | 45.5 | 7 A | 54.5 | 54.4 | 52.7 | 5.0 |
| 26 | 30.32 | 30.20 | 30.277 | 67.0 | 2:30 P | 54.5 | 1 A | 60.7 | 60.0 | 60.3 | 0.3 |
| 27 | 30.25 | 30.15 | 30.206 | 74.5 | 3 P | 58.5 | 6 A | 66.5 | 64.2 | 60.0 | 6.3 |
| 28 | 30.15 | 29.94 | 30.032 | 66.5 | 6 P | 52.0 | 6 A | 59.3 | 59.5 | 59.7 | 0.7 |
| 29 | 29.94 | 29.85 | 29.916 | 78.5 | 2 P | 63.0 | 6 A | 70.7 | 67.2 | 65.7 | 5.7 |
| 30 | 29.88 | 29.61 | 29.768 | 72.5 | 0:30 P | 64.0 | 3 A | 68.3 | 66.5 | 66.3 | 1.0 |
| 31 | 29.77 | 29.57 | 29.663 | 68.0 | 2:30 P | 48.0 | 12 P | 58.0 | 61.9 | 59.0 | 4.0 |

# DAILY SUMMARY.

| Day. | Humidity. | | | Wind. | | | | | Precipitation. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Mean Dew Point. | Mean Force vapor. | Mean Relative Humidity. | Prevailing Direction. | Total Movement in Miles. | Maximum Pressure Per Square Ft | Miles per Hour. | Time. | Beginning. | Ending. | Total in Inches. | |
| | | | | | | | | | | | Rain.** | Snow. |
| 1 | 34.0 | .299 | 67.5 | N.W. | 63 | 0.5 | 10 | 6 A | | | | |
| 2 | 46.0 | .389 | 82.0 | S.S.W. | 111 | 3.0 | 24 | 6 P | 4:30 P | 12 P | .02 | |
| 3 | 55.5 | .470 | 88.0 | S. | 176 | 3.0 | 24 | 3 P | 0 A | 5 A | .22 | |
| 4 | 38.5 | .333 | 70.5 | S. | 74 | 1.0 | 14 | 2 P | | | | |
| 5 | 48.5 | .450 | 77.5 | S.S.W. | 239 | 5.0 | 32 | 1 P | 8 P | 12 P | .06 | |
| 6 | 54.5 | .487 | 86.0 | S.S.W. | 208 | 9.0 | 42 | 2 P | 0 A | 3 P | .29 | |
| 7 | 26.0 | .271 | 54.5 | N. | 279 | 2.0 | 20 | 8 A | | | | |
| 8 | 31.5 | .288 | 63.5 | S.S.W. | 57 | 0.0 | — | — | | | | |
| 9 | 37.5 | .302 | 78.5 | S. | 63 | 1.0 | 14 | 2 P | | | | |
| 10 | 41.0 | .311 | 86.0 | S.W. | 27 | 0.0 | — | — | | | | |
| 11 | 44.5 | .408 | 72.5 | S.S.W. | 85 | 2.5 | 22 | 4 P | | | | |
| 12 | 50.0 | .398 | 93.5 | S. | 24 | 0.0 | — | — | 8 A | 6 P | .22 | |
| 13 | 50.5 | .452 | 81.0 | S.S.W. | 170 | 2.5 | 22 | 4 P | | | | |
| 14 | 38.0 | .354 | 66.5 | W.S.W. | 168 | 2.0 | 20 | 6 P | | | | |
| 15 | 29.5 | .280 | 59.0 | W. | 149 | 1.5 | 17 | 12 M | | | | |
| 16 | 37.0 | .288 | 78.0 | S. | 24 | 0.0 | — | — | | | | |
| 17 | 42.0 | .320 | 88.0 | S.S.W. | 54 | 0.0 | — | — | | | | |
| 18 | 37.0 | .287 | 78.0 | N.N.E. | 227 | 2.5 | 22 | 10 A | | | | |
| 19 | 32.5 | .233 | 81.0 | S.S.W. | 57 | 0.5 | 10 | 1 P | | | | |
| 20 | 46.5 | .374 | 89.0 | S. | 274 | 10.5 | 46 | 4 P | 4 P | 12 P | .20 | |
| 21 | 39.0 | .328 | 75.0 | N.W. | 296 | 2.5 | 22 | 10 A | | | | |
| 22 | 28.5 | .277 | 58.0 | N. | 143 | 1.0 | 14 | 10 A | | | | |
| 23 | 32.5 | .243 | 77.5 | S.S.W. | 21 | 0.0 | — | — | | | | |
| 24 | 38.5 | .288 | 84.5 | S.W. | 47 | 0.0 | — | — | | | | |
| 25 | 52.0 | .414 | 96.5 | S.S.E. | 98 | 1.0 | 14 | 11 P | | | | |
| 26 | 59.5 | .533 | 97.0 | S. | 125 | 0.5 | 10 | 4 P | 6:30 A | 10 A | .03 | |
| 27 | 58.5 | .542 | 91.5 | S. | 139 | 1.5 | 17 | 2 P | | | | |
| 28 | 59.0 | .544 | 95.5 | S.S.W. | 102 | 2.5 | 22 | 2 P | 2:30 P | 3 P | .01 | |
| 29 | 65.0 | .655 | 95.0 | S. | 243 | 2.5 | 22 | 6 P | | | | |
| 30 | 66.0 | .666 | 95.0 | S. | 242 | 5.0 | 32 | 11 P | 9:30 P | 12 P | .10 | |
| 31 | 57.5 | .540 | 89.5 | W.N.W. | 312 | 5.0 | 32 | 1 A | 0 A | 6 A | .17 | |

**Rain or melted snow at base of tower. *Included in following day.

## REMARKS

The weather during October was more seasonable than that of the preceding month, and in some respects more pleasant. The precipitation was small, the temperature rather high and the amount of sunshine fully up to the normal. The great preponderance of wind from the south undoubtedly caused the comparatively warm weather which was especially noticeable the last few days of the month. The last week was in fact the warmest part of the month. While several frosts were noted early in the month, the first killing frost of the season occurred on the 19th, a date much later than usual.

The records of the several weather elements show the following features of interest: The mean barometer was considerably higher than the normal and the range was less than usual for the time of year. The maximum pressure was practically normal and the minimum rather high. On only a few days was the mean barometer lower than 30 inches.

The total wind movement was slightly more than usual, although there were but two gales. For about two-thirds of the time the wind was from the south or south southwest.

The mean temperature was about two degrees higher than usual. The maximum temperature was practically normal, but came much later in the month than usual. The minimum temperature was more than four degrees higher than the normal for this feature.

The mean dew point and relative humidity were both considerably higher than their normals.

The total precipitation was about one-third the normal amount and all of it occurred in small storms.

The last week was rather cloudy, but the total amount of sunshine for the month was considerably more than the normal. The mild weather continued up to the close of the month.

J. E. OSTRANDER, Meteorologist.

H. BERMAN, Acting Observer.

BULLETIN No. 359. NOVEMBER, 1918

# Meteorological Observations
AT THE
# MASSACHUSETTS
# AGRICULTURAL EXPERIMENT
# STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.
*Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.*
*Height of Wind Instruments 72 ft. Time used, 75th Mer.*

## MONTHLY SUMMARY.

### **Pressure.** In inches.

| | |
|---|---|
| Maximum reduced to freezing | 30.29, 6th, 9 A |
| Minimum reduced to freezing | 28.75, 18th, 9 P |
| Reduced maximum reading | 30.60, 6th, 9 A |
| Reduced† minimum reading | 29.05, 18th, 9 P |
| Mean semi-daily reduced | 30.023 |
| Monthly range | 1.55 |

### ***Air Temperature.** In Degrees Fahr.

| | |
|---|---|
| Highest | 62.5, 8th, 1:30 P |
| Lowest | 15.5, 27th, 5 A |
| Mean hourly | 39.4 |
| Mean of means of max. and min. | 40.0 |
| Mean sensible (wet bulb) | 35.6 |
| Monthly range | 47.0 |
| Highest mean daily | 56.6, 18th |
| Lowest mean daily | 22.0, 26th |
| Mean maximum | 48.6 |
| Mean minimum | 31.3 |
| Mean daily range | 17.3 |
| Greatest daily range | 31.5, 7th |
| Least daily range | 3.5, 20th |

### **Humidity.**

| | |
|---|---|
| Mean dew point | 32.0 |
| Mean force of vapor | .235 |
| Mean relative humidity | 81.3 |

### **Precipitation.** In inches.

| | |
|---|---|
| Total precipitation, in inches | 2.87 |
| Total snow, in inches | Trace |
| Number of days on which .01 inch or more rain fell | 7 |

*Temperature in ground shelter.
**Reduced to freezing and sea-level.

### **Wind.**

| | |
|---|---|
| Total movement | 3730 m |
| Greatest daily movement | 297m, 23d |
| Least daily movement | 24m, 17th |
| Mean daily movement | 124 m |
| Mean hourly velocity | 5.2 m |

Maximum pressure per square foot, 6.0 lbs = 35m per hour, 18th, 6 A, S.S.W.
Maximum velocity for 5 minutes, 24m per hour, 30th, 1:30 P, W.
Prevailing direction, West.

Summary.

| | |
|---|---|
| South | 13 per cent. |
| West Southwest | 17 " " |
| West Northwest | 13 " " |
| North | 10 " " |
| West | 10 " " |
| Northwest | 10 " " |
| North Northwest | 10 " " |
| Other directions | 17 " " |

### **Weather.**

| | |
|---|---|
| Mean cloudiness observed | 49 per cent |
| Total cloudiness recorded by the Sun Thermometer | 185 hours = 63 per cent |
| Number of clear days | 4 |
| Number of fair days | 9 |
| Number of cloudy days | 17 |

### **Bright Sunshine.**

Number hours recorded, 108 hrs, = 37 per cent

**Rain,** 4th, 17th, 18th, 19th, 20th, 28th, 29th.

**Snow,** 4th, 30th.

**Gales,** 35 miles or more per hour 35 m 18th, S.S.W.

# DAILY SUMMARY.

| Day. | Barometer Reduced to Sea Level. |  |  | Temperature. Ground Shelter. |  |  |  |  |  |  | No. Hours of Bright Sunshine |
|---|---|---|---|---|---|---|---|---|---|---|---|
|  | Maximum | Minimum. | Mean. Semi-daily | Maximum | Time. | Minimum. | Time. | Mean of Max. and Min. | Mean Hourly Draper. | Mean Sensible Wet Bulb. |  |
| 1 | 29.99 | 29.77 | 29.896 | 54.0 | 2 P | 39.0 | 12 P | 46.5 | 45.4 | 40.3 | 4.5 |
| 2 | 30.19 | 29.99 | 30.131 | 49.5 | 2 P | 33.0 | 7 A | 41.3 | 41.8 | 39.0 | 3.3 |
| 3 | 30.30 | 30.19 | 30.285 | 52.0 | 4 P | 31.0 | 7 A | 41.5 | 40.7 | 35.7 | 5.5 |
| 4 | 30.25 | 30.09 | 30.166 | 41.5 | 1 P | 29.0 | 3:30 A | 35.3 | 36.8 | 35.7 | 0.0 |
| 5 | 30.44 | 30.12 | 30.342 | 50.0 | 3:30 P | 36.0 | 12 P | 43.0 | 40.6 | 37.7 | 4.7 |
| 6 | 30.60 | 30.44 | 30.560 | 49.5 | 4:30 P | 28.5 | 7:30 A | 39.0 | 36.0 | 37.0 | 7.4 |
| 7 | 30.46 | 30.17 | 30.293 | 53.0 | 0:30 P | 21.5 | 6:30 A | 37.3 | 38.6 | 34.0 | 7.0 |
| 8 | 30.35 | 30.17 | 30.285 | 62.5 | 1:30 P | 34.5 | 3:30 A | 48.5 | 44.4 | 38.0 | 8.3 |
| 9 | 30.36 | 30.11 | 30.290 | 49.0 | 3 P | 34.5 | 6 A | 41.7 | 43.5 | 43.7 | 0.0 |
| 10 | 30.30 | 30.02 | 30.143 | 54.5 | 12 M | 32.0 | 12 P | 43.3 | 46.0 | 44.0 | 7.0 |
| 11 | 30.43 | 30.30 | 30.426 | 49.0 | 2 P | 26.0 | 12 P | 37.5 | 35.2 | 30.3 | 9.0 |
| 12 | 30.44 | 30.23 | 30.371 | 51.0 | 1:30 P | 21.0 | 6 A | 36.0 | 32.1 | 26.0 | 8.3 |
| 13 | 30.23 | 29.89 | 30.067 | 41.0 | 4 P | 23.0 | 4 A | 32.0 | 32.9 | 32.5 | 0.0 |
| 14 | 30.12 | 29.87 | 29.978 | 48.0 | 1:30 P | 27.5 | 7 A | 37.7 | 36.3 | 29.7 | 3.7 |
| 15 | 30.18 | 30.09 | 30.170 | 57.5 | 2 P | 28.0 | 3 A | 42.7 | 42.4 | 38.3 | 1.0 |
| 16 | 30.25 | 30.18 | 30.252 | 58.5 | 2 P | 39.5 | 7 A | 49.0 | 48.2 | 42.5 | 3.0 |
| 17 | 30.23 | 29.68 | 29.992 | 49.0 | 8 P | 42.0 | 4 A | 45.5 | 45.0 | 45.3 | 0.0 |
| 18 | 29.68 | 29.05 | 29.231 | 61.5 | 3 P | 46.5 | 0 A | 54.0 | 56.6 | 56.7 | 0.0 |
| 19 | 29.49 | 29.19 | 29.377 | 52.0 | 4 P | 45.0 | 8 A | 48.5 | 48.3 | 44.7 | 0.3 |
| 20 | 29.75 | 29.49 | 29.648 | 46.5 | 0 A | 43.0 | 1 P | 44.7 | 44.3 | 43.3 | 0.0 |
| 21 | 29.93 | 29.75 | 29.900 | 44.0 | 3 P | 36.0 | 12 P | 40.0 | 41.6 | 37.5 | 0.0 |
| 22 | 29.99 | 29.90 | 29.968 | 43.0 | 1:30 P | 28.5 | 6 A | 35.7 | 35.2 | 31.3 | 1.2 |
| 23 | 29.99 | 29.92 | 29.965 | 41.0 | 1:30 P | 31.5 | 8 A | 36.3 | 34.8 | 29.0 | 5.0 |
| 24 | 29.98 | 29.74 | 29.855 | 47.0 | 2 P | 30.0 | 6:30 A | 38.5 | 36.8 | 30.0 | 6.5 |
| 25 | 29.84 | 29.71 | 29.760 | 43.0 | 1 P | 27.5 | 4 A | 35.3 | 35.4 | 32.0 | 7.2 |
| 26 | 30.18 | 29.84 | 30.122 | 35.0 | 0 A | 16.0 | 7 A | 25.5 | 22.0 | 15.3 | 8.9 |
| 27 | 30.06 | 29.89 | 29.964 | 40.0 | 4 P | 15.5 | 5 A | 27.7 | 27.0 | 22.3 | 0.8 |
| 28 | 30.14 | 29.54 | 30.002 | 43.0 | 12 P | 23.5 | 7 A | 33.3 | 34.1 | 29.5 | 3.0 |
| 29 | 29.69 | 29.47 | 29.567 | 49.5 | 2 P | 41.0 | 3 A | 45.3 | 42.6 | 37.5 | 0.4 |
| 30 | 29.72 | 29.61 | 29.695 | 43.0 | 1:30 P | 30.0 | 12 P | 36.5 | 36.2 | 29.5 | 2.0 |

# DAILY SUMMARY.

| Day. | Humidity. | | | Wind. | | | | | Precipitation. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Total in Inches. | |
| | Mean Dew Point. | Mean Force vapor. | Mean Relative Humidity. | Prevailing Direction. | Total Movement in Miles. | Maximum Pressure Per Square Ft | Miles per Hour. | Time. | Beginning. | Ending. | Rain.** | Snow. |
| 1 | 38.5 | .246 | 86.0 | W.N.W. | 134 | 1.0 | 14 | 9 A | | | | |
| 2 | 36.0 | .255 | 84.0 | W.N.W. | 124 | 2.5 | 22 | 3 P | | | | |
| 3 | 32.5 | .277 | 82.5 | W. | 79 | 1.5 | 17 | 10 A | | | | |
| 4 | 34.0 | .218 | 91.0 | N.N.W. | 82 | 0.5 | 10 | 12 P | 6 A | 12 P | .31 | T. |
| 5 | 35.0 | .238 | 88.0 | N. | 227 | 1.0 | 14 | 7 A | | | | |
| 6 | 35.5 | .206 | 91.0 | E. | 134 | 0.5 | 10 | 3 P | | | | |
| 7 | 32.0 | .222 | 86.5 | S. | 44 | 0.0 | — | — | | | | |
| 8 | 35.5 | .248 | 84.0 | N. | 117 | 1.5 | 17 | 12 M | | | | |
| 9 | 41.5 | .301 | 86.5 | S. | 83 | 1.0 | 14 | 12 P | | | | |
| 10 | 43.0 | .300 | 92.5 | W. | 100 | 2.0 | 20 | 3 P | | | | |
| 11 | 27.5 | .179 | 85.0 | N. | 112 | 1.5 | 17 | 10 A | | | | |
| 12 | 22.5 | .151 | 83.0 | N.W. | 52 | 0.0 | — | — | | | | |
| 13 | 29.5 | .197 | 86.0 | N.W. | 38 | 0.0 | — | — | | | | |
| 14 | 26.5 | .178 | 82.5 | W.S.W. | 129 | 3.5 | 26 | 2 P | | | | |
| 15 | 35.0 | .259 | 82.0 | S. | 52 | 0.5 | 10 | 1 P | | | | |
| 16 | 40.0 | .297 | 85.5 | S.E. | 52 | 0.0 | — | — | | | | |
| 17 | 45.0 | .306 | 98.0 | N.N.W. | 24 | 0.0 | — | — | 8 A | 12 P | .85 | |
| 18 | 55.0 | .483 | 94.0 | S.S.W. | 225 | 6.0 | 35 | 6 A | 0 A | 12 P | .84 | |
| 19 | 43.0 | .317 | 87.0 | S.W. | 178 | 2.0 | 20 | 0 A | 0 A | 10 A | .13 | |
| 20 | 42.5 | .290 | 94.0 | W. | 42 | 0.0 | — | — | 1 P | 8 P | .08 | |
| 21 | 34.0 | .248 | 81.5 | N.N.W. | 101 | 0.5 | 10 | 2 P | | | | |
| 22 | 27.0 | .193 | 79.5 | N.W. | 110 | 2.0 | 20 | 9 P | | | | |
| 23 | 20.0 | .195 | 57.5 | W.N.W. | 297 | 3.0 | 24 | 1 P | | | | |
| 24 | 21.0 | .201 | 58.0 | W.S.W. | 149 | 2.5 | 22 | 1 A | | | | |
| 25 | 29.5 | .207 | 82.5 | W.N.W. | 175 | 3.0 | 24 | 3 P | | | | |
| 26 | 6.0 | .101 | 62.0 | W.S.W. | 246 | 3.0 | 24 | 10 P | | | | |
| 27 | 16.0 | .138 | 71.5 | S. | 77 | 0.5 | 10 | 7 A | | | | |
| 28 | 22.5 | .198 | 64.5 | S.S.E. | 98 | 0.5 | 10 | 3 P | 5 A | 12 P | .23 | |
| 29 | 35.5 | .261 | 81.0 | W.S.W. | 181 | 5.5 | 33 | 12 M | 0 A | 9 A | 43 | |
| 30 | 18.5 | .201 | 52.5 | W.S.W. | 268 | 5.5 | 33 | 2 P | 2:30 P | 3 P | T. | T. |

**Rain or melted snow at base of tower. *Included in following day.

## REMARKS

During the month of November the weather presented but few features of unusual interest. Perhaps the most noticeable feature was the fact that it was not quite so cold as is usual at this time of year and that winter had not fully started when the month closed. The large amount of cloudiness was also a feature which could not well escape notice. Wind directions were unusually variable although the total wind movement was not large.

An analysis of the several records kept at this station shows the following features: The mean barometer was practically normal and the range much greater than usual. The last week of the month was a period of rather low barometer, and rather rapid changes in pressure.

The mean temperature was about one and one-half degrees higher than the normal. The maximum temperature was slightly less than usual and the minimum was higher than its normal value, giving a comparatively small range. The mean dew-point and relative humidity were both high.

The total precipitation was about ten per cent below the normal and nearly all of it fell during the last half of the month. Traces of snow fell early in the month and also on the last day of the month.

The total wind movement was about eighty per cent of the normal and but one gale was recorded. The amount of sunshine was unusually small, especially during the last half of the month.

J. E. OSTRANDER, Meteorologist.

H. BERMAN, Acting Observer.

BULLETIN No. 360. DECEMBER, 1918

# Meteorological Observations
AT THE
# MASSACHUSETTS
# AGRICULTURAL EXPERIMENT
# STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.
*Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.*
*Height of Wind Instruments 72 ft. Time used, 75th Mer.*

## MONTHLY SUMMARY.

**Pressure.** In inches.

| | |
|---|---|
| Maximum reduced to freezing | 30.38, 19th, 9 A |
| Minimum reduced to freezing | 29.20, 4th, 12 M |
| Reduced maximum reading | 30.70, 19th, 9 A |
| Reduced minimum reading | 29.51, 4th, 12 M |
| Mean semi-daily reduced | 30.130 |
| Monthly range | 1.19 |

***Air Temperature.** In Degrees Fahr.

| | |
|---|---|
| Highest | 52.0, 21st, 3 P |
| Lowest | -3.0, 7th, 9 A |
| Mean hourly | 28.7 |
| Mean of means of max. and min. | 29.3 |
| Mean sensible (wet bulb) | 26.2 |
| Monthly range | 55.0 |
| Highest mean daily | 46.8, 22d |
| Lowest mean daily | 12.0, 7th |
| Mean maximum | 36.5 |
| Mean minimum | 22.0 |
| Mean daily range | 14.5 |
| Greatest daily range | 28.0, 21st |
| Least daily range | 5.0, 14th, 25th |

**Humidity.**

| | |
|---|---|
| Mean dew point | 22.9 |
| Mean force of vapor | .159 |
| Mean relative humidity | 84.5 |

**Precipitation.** In inches.

| | |
|---|---|
| Total precipitation, in inches | 2.95 |
| Total snow, in inches | 7¼ |
| Number of days on which .01 inch or more rain fell | 11 |

Days of sleighing, 10

*Temperature in ground shelter.
**Reduced to freezing and sea-level.

**Wind.**

| | |
|---|---|
| Total movement | 3239 m |
| Greatest daily movement | 348m, 1st |
| Least daily movement | 4m, 20th |
| Mean daily movement | 104 m |
| Mean hourly velocity | 4.3 m |

Maximum pressure per square foot, 11.0 lbs = 49m per hour, 1st, 4 A, N.W.
Maximum velocity for 5 minutes, 24m per hour, 1st, 1 A, W.N.W.
Prevailing direction, West Northwest.

Summary.

| | |
|---|---|
| Southwest | 10 per cent. |
| South Southwest | 10 " " |
| West Northwest | 16 " " |
| North | 13 " " |
| West | 10 " " |
| Northwest | 19 " " |
| North Northwest | 13 " " |
| Other directions | 9 " " |

**Weather.**

| | |
|---|---|
| Mean cloudiness observed | 55 per cent |
| Total cloudiness recorded by the Sun Thermometer | 125 hours = 44 per cent |
| Number of clear days | 11 |
| Number of fair days | 9 |
| Number of cloudy days | 11 |

**Bright Sunshine.**

Number hours recorded, 158 hrs, = 56 per cent

**Rain.** 1st, 6th, 11th, 13th, 14th, 15th, 22d, 24th, 25th.

**Snow,** 1st, 3d, 4th, 6th, 7th, 11th, 26th, 27th. 31st.

**Hail,** 11th.

**Gales,** 35 miles or more per hour 47 m., 1st, N.W.

# DAILY SUMMARY.

| Day. | Barometer Reduced to Sea Level. | | | Temperature. Ground Shelter. | | | | | | | No. Hours of Bright Sunshine |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Maximum | Minimum. | Mean. Semi-daily | Maximum | Time. | Minimum. | Time. | Mean of Max. and Min. | Mean Hourly Draper. | Mean Sensible Wet Bulb. | |
| 1 | 30.27 | 29.54 | 30.000 | 33.0 | 4 A | 17.0 | 12 P | 25.0 | 25.6 | 18.3 | 8.3 |
| 2 | 30.29 | 29.94 | 30.140 | 31.0 | 8:30 P | 13.5 | 7:30 A | 22.3 | 22.6 | 20.0 | 6.5 |
| 3 | 29.94 | 29.68 | 29.809 | 35.0 | 3 P | 27.5 | 2 A | 31.3 | 30.5 | 29.0 | 5.1 |
| 4 | 29.68 | 29.51 | 29.558 | 37.0 | 4 P | 28.0 | 10 A | 32.5 | 31.2 | 28.5 | 5.0 |
| 5 | 29.95 | 29.63 | 29.864 | 32.5 | 8 A | 22.0 | 8 P | 27.3 | 28.4 | 25.0 | 6.3 |
| 6 | 30.22 | 29.61 | 29.884 | 27.5 | 2 P | 12.0 | 12 P | 19.7 | 20.5 | 18.0 | 6.5 |
| 7 | 30.33 | 29.96 | 30.192 | 23.0 | 8 P | −3.0 | 9 A | 10.0 | 12.0 | 11.5 | 2.0 |
| 8 | 29.96 | 29.71 | 29.830 | 32.5 | 4 P | 20.5 | 0 A | 26.5 | 25.7 | 24.3 | 0.5 |
| 9 | 30.04 | 29.75 | 29.806 | 43.5 | 1 P | 28.0 | 6 A | 35.7 | 35.1 | 29.7 | 8.0 |
| 10 | 30.53 | 30.04 | 30.306 | 31.0 | 0 A | 14.0 | 12 P | 22.5 | 20.2 | 12.5 | 8.0 |
| 11 | 30.58 | 30.35 | 30.512 | 26.5 | 12 P | 9.5 | 6 A | 18.0 | 17.4 | 19.3 | 0.4 |
| 12 | 30.40 | 30.29 | 30.355 | 38.0 | 3 P | 26.5 | 0 A | 32.3 | 31.6 | 30.5 | 6.5 |
| 13 | 30.41 | 30.25 | 30.365 | 34.0 | 3 P | 26.0 | 6 A | 30.0 | 30.8 | 30.0 | 4.3 |
| 14 | 30.25 | 29.88 | 30.078 | 37.0 | 2 P | 32.0 | 1 A | 34.5 | 34.5 | 34.0 | 2.8 |
| 15 | 30.28 | 29.85 | 30.092 | 43.0 | 2 P | 31.0 | 12 P | 37.0 | 37.6 | 39.0 | 3.5 |
| 16 | 30.51 | 30.28 | 30.476 | 36.0 | 3 P | 31.0 | 0 A | 33.5 | 33.3 | 32.3 | 4.5 |
| 17 | 30.58 | 30.42 | 30.522 | 40.0 | 3 P | 27.0 | 12 P | 33.5 | 31.8 | 26.3 | 8.3 |
| 18 | 30.69 | 30.54 | 30.659 | 40.0 | 3 P | 22.0 | 8 A | 31.0 | 28.3 | 23.0 | 7.7 |
| 19 | 30.70 | 30.59 | 30.650 | 41.5 | 3 P | 15.0 | 7:30 A | 28.3 | 25.2 | 17.5 | 8.2 |
| 20 | 30.62 | 30.48 | 30.580 | 45.0 | 3:30 P | 18.0 | 7:30 A | 31.5 | 29.3 | 23.7 | 8.0 |
| 21 | 30.48 | 30.38 | 30.432 | 52.0 | 3 P | 24.0 | 6 A | 38.0 | 34.5 | 31.0 | 7.7 |
| 22 | 30.38 | 29.99 | 30.202 | 50.0 | 12 P | 27.5 | 3 A | 38.7 | 37.6 | 40.7 | 1.3 |
| 23 | 30.20 | 29.92 | 30.116 | 50.0 | 0 A | 37.0 | 12 P | 43.5 | 46.8 | 44.7 | 7.8 |
| 24 | 30.19 | 29.62 | 30.037 | 41.5 | 5 P | 28.0 | 7 A | 34.7 | 34.4 | 33.3 | 2.8 |
| 25 | 29.68 | 29.53 | 29.572 | 40.0 | 5 P | 35.0 | 9 A | 37.5 | 36.1 | 35.0 | 0.4 |
| 26 | 29.95 | 29.68 | 29.827 | 36.0 | 3 A | 26.5 | 12 P | 31.3 | 31.7 | 29.0 | 1.0 |
| 27 | 30.08 | 29.95 | 30.048 | 28.5 | 2 P | 19.5 | 8:30 A | 24.0 | 24.5 | 21.7 | 8.0 |
| 28 | 29.95 | 29.70 | 29.820 | 31.5 | 2 P | 19.0 | 12 P | 25.3 | 24.0 | 20.5 | 6.5 |
| 29 | 30.04 | 29.69 | 29.850 | 33.5 | 3 P | 18.0 | 2 A | 25.7 | 22.6 | 19.3 | 3.0 |
| 30 | 30.30 | 30.04 | 30.215 | 35.0 | 4:30 P | 16.0 | 2 A | 25.5 | 25.6 | 23.3 | 8.5 |
| 31 | 30.33 | 30.13 | 30.225 | 27.0 | 12 P | 15.5 | 8:30 A | 21.3 | 21.9 | 20.5 | 0.1 |

# DAILY SUMMARY.

| Day. | Humidity. | | | Wind. | | | | | Precipitation. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Mean Dew Point. | Mean Force vapor. | Mean Relative Humidit | Prevailing Direction. | Total Movement in Miles. | Maximum Pressure Per Square Ft | Miles per Hour. | Time. | Beginning. | Ending. | Total in Inches. | |
| | | | | | | | | | | | Rain.** | Snow. |
| 1 | 7.0 | .120 | 53.5 | N. | 348 | 11.0 | 47 | 4 A | 3 A | 4:30 A | .02 | T |
| 2 | 13.5 | .128 | 67.5 | N.W. | 61 | 0.5 | 10 | 7 P | | | | |
| 3 | 24.0 | .172 | 79.0 | S. | 34 | 0.0 | — | — | 0 A | 5 A | 06 | ¾ |
| 4 | 23 0 | .170 | 74.0 | W.N.W. | 32 | 1.5 | 17 | 12 P | 11 P | 12 P | T | T |
| 5 | 21.5 | .145 | 84.0 | W.N.W. | 259 | 3.0 | 24 | 2 P | | | | |
| 6 | 15.5 | .106 | 85.0 | N.N.W. | 181 | 3 0 | 24 | 3 P | 0 A | 1 P | .40 | 6 |
| 7 | 8.5 | .083 | 89 5 | S.W. | 81 | 0.5 | 10 | 3 P | 1:30 P | 3 P | T | T |
| 8 | 22.5 | .136 | 91.0 | S.S.W. | 32 | 0.0 | — | — | | | | |
| 9 | 24.5 | .185 | 74.5 | N.W. | 154 | 2.0 | 20 | 2 P | | | | |
| 10 | 7.0 | .084 | 73.5 | N. | 298 | 5.5 | 33 | 11 A | | | | |
| 11 | 17.5 | .110 | 92.0 | N N.W. | 45 | 0.0 | — | — | 1 P | 11 P | .48 | ½ |
| 12 | 28.5 | .175 | 92.5 | W.N.W. | 86 | 0.0 | — | — | | | | |
| 13 | 28.5 | .170 | 95.0 | W. | 5 | 0.0 | — | — | 2 P | 12 P | .20 | |
| 14 | 32.5 | .198 | 95.0 | W.N.W. | 19 | 0.0 | — | — | 0 A | 12 P | .76 | |
| 15 | 38 0 | .243 | 94.0 | N.N.W. | 76 | 1.0 | 14 | 1 A | 0 A | 6 P | .11 | |
| 16 | 30 0 | .190 | 90.5 | N. | 124 | 1.0 | 14 | 11 P | | | | |
| 17 | 19.5 | .160 | 68.0 | N.N.E. | 282 | 2.0 | 20 | 4 A | | | | |
| 18 | 19.5 | .134 | 81.0 | N. | 123 | 0.5 | 10 | 1 P | | | | |
| 19 | 14.5 | .103 | 84.5 | W. | 18 | 0.0 | — | — | | | | |
| 20 | 21.0 | .140 | 87.5 | S.W. | 4 | 0.0 | — | — | | | | |
| 21 | 29.0 | .185 | 90.0 | S.S.W. | 41 | 0.0 | — | — | | | | |
| 22 | 39.0 | .272 | 93 5 | S S.W. | 28 | 0.5 | 10 | 9 P | 1 P | 12 P | .25 | |
| 23 | 43.0 | .312 | 89 0 | N.W. | 160 | 2.0 | 20 | 1 P | | | | |
| 24 | 32 0 | .196 | 95 5 | N.N.E | 58 | 0.0 | — | — | 9 A | 12 P | .51 | |
| 25 | 33 0 | .213 | 89.0 | N W. | 102 | 1.0 | 14 | 6 P | 0 A | 2 P | .15 | |
| 26 | 27.0 | .166 | 89.5 | W.N.W. | 186 | 1.5 | 17 | 7 P | 12 M | 1 P | T | T |
| 27 | 19.0 | .124 | 87 0 | W. | 84 | 1.0 | 14 | 1 A | 12 M | 6 P | T | T |
| 28 | 17 5 | .118 | 82.5 | N.N W. | 69 | 1.0 | 14 | 1 P | | | | |
| 29 | 16.0 | .111 | 86 0 | N.W. | 99 | 1.0 | 14 | 3 P | | | | |
| 30 | 19 5 | .136 | 78.5 | S.W. | 121 | 2 0 | 20 | 1 P | | | | |
| 31 | 18.0 | .118 | 86.0 | N.W. | 29 | 0.0 | — | — | 8:30 A | 4 P | 0.1 | T |

**Rain or melted snow at base of tower. *Included in following day.

# Annual Summary for 1918.

### **Pressure.** In inches.

| | |
|---|---|
| Maximum reduced to freezing, | 30.38, Dec. 19th, 9 A. |
| Minimum reduced to freezing, | 28..52 Jan. 15th, 1 P. |
| Maximum reduced to freezing and sea-level, | 30.70, Feb. 21st, 12 P. Dec. 19th, 9 A. |
| Minimum reduced to freezing and sea-level, | 28.84, Jan. 15th, 1 P. |
| Mean semi-daily reduced to freezing and sea-level, | 30.023 |
| Annual range, | 1.86 |

### ***Air Temperature.** In degrees Fahr.

| | |
|---|---|
| Highest, | 100.0, Aug. 7th, 3 P. |
| Lowest, | —22.5, Feb. 2d, 6 A. |
| Mean hourly, | 46.5 |
| Mean of means of max. and min., | 46.9 |
| Mean sensible (wet bulb), | 41.9 |
| Annual range, | 122.5 |
| Highest mean daily, | 81.7, Aug. 7 |
| Lowest mean daily, | —9.1, Feb. 5 |
| Mean maximum, | 58.0 |
| Mean minimum, | 35.8 |
| Mean daily range, | 22.2 |
| Greatest daily range, | 44.5, Apr. 15 |
| Least daily range, | 3.5, Nov. 20 |

### **Humidity.**

| | |
|---|---|
| Mean dew point, | 37.8 |
| Mean force of vapor, | .380 |
| Mean relative humidity, | 76.4 |

### **Wind.**

| | |
|---|---|
| Total movement, | 50.435 m |
| Greatest daily movement, | 606m., March 3 |
| Least daily movement, | 4 m., Dec. 20 |
| Mean daily movement, | 138 m |
| Mean hourly velocity, | 5.7 m |
| Maximum pressure per square foot, | 20.0 lbs., 63 m. per hour, Feb. 26, 3 P., W.N.W. |
| Maximum velocity for 5 minutes, | 45 m. per hour, Feb. 26th, 1 P., W.N.W. |
| Prevailing direction, | West. |

Summary.

| | |
|---|---|
| South Southwest | 16 per ce |
| South | 15 " " |
| Northwest | 11 " " |
| North Northwest, | 10 " " |
| North | 9 " " |
| Other directions, | 39 " " |

### **Precipitation.** In inches.

| | |
|---|---|
| Total precipitation, rain or melted snow, | 37.47 |
| Snow total in inches, | 50¾ |
| Number of days on which .01 or more rain or melted snow fell, | 123 |

### **Weather.**

| | |
|---|---|
| Mean cloudiness observed, | 47 per cent. |
| Total cloudiness recorded by Sun Thermometer, | 1920 hrs.=43 per cent. |
| Number of clear days, | 106 |
| Number of fair days, | 151 |
| Number of cloudy days, | 108 |

### **Bright Sunshine.**

Number of hours recorded, 2532 hrs.=57 per cent

### **Dates of Frosts.**

| | |
|---|---|
| Last, | April 26th |
| First, | Sept. 11th |

### **Dates of Snow.**

| | |
|---|---|
| Last, | April 13th |
| First, | Nov. 4th |
| Total days of sleighing, | 79 |

### **Gales of 50 or More Miles Per Hour.**

Feb. 4th, 57m., W.N.W.: Feb. 20th, 57m, N.W.; Feb. 25th, 53m., S.W.: Feb. 26th, 63m, WN.W.; March 3d, 60m., N.W.

J. E. OSTRANDER,
*Meteorologist.*

H. BEAMAN,
*Acting Observer.*

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*Temperature in ground shelter.

**BULLETIN No. 361. JANUARY, 1919**

# Meteorological Observations
AT THE
# MASSACHUSETTS
# AGRICULTURAL EXPERIMENT
# STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.
*Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.*
*Height of Wind Instruments 72 ft. Time used, 75th Mer.*

## MONTHLY SUMMARY.

### **Pressure.** In inches.

| | |
|---|---|
| Maximum reduced to freezing | 30.34, 12th, 9 A |
| Minimum reduced to freezing | 29.02, 24th, 5 A |
| Reduced maximum reading | 30.68, 12th, 9 A |
| Reduced minimum reading | 29.33, 24th, 5 A |
| Mean semi-daily reduced | 30.008 |
| Monthly range | 1.35 |

### ***Air Temperature.** In Degrees Fahr.

| | |
|---|---|
| Highest | 54.0, 2d, 3 A |
| Lowest | -8.5, 12th, 7:30A |
| Mean hourly | 28.1 |
| Mean of means of max. and min. | 28.7 |
| Mean sensible (wet bulb) | 25.1 |
| Monthly range | 62.5 |
| Highest mean daily | 39.5, 2d |
| Lowest mean daily | 3.5, 12th |
| Mean maximum | 37.7 |
| Mean minimum | 19.8 |
| Mean daily range | 18.0 |
| Greatest daily range | 34.5, 13th |
| Least daily range | 4.5, 3d |

### **Humidity.**

| | |
|---|---|
| Mean dew point | 21.1 |
| Mean force of vapor | .156 |
| Mean relative humidity | 79.6 |

### **Precipitation.** In inches.

| | |
|---|---|
| Total precipitation, in inches | 2.02 |
| Total snow, in inches | 6¼ |
| Number of days on which .01 inch or more rain fell | 8 |

Days of sleighing, 20

### **Wind.**

| | |
|---|---|
| Total movement | 4554 m |
| Greatest daily movement | 355m, 11th |
| Least daily movement | 10m, 1st |
| Mean daily movement | 144 m |
| Mean hourly velocity | 6.0m |

Maximum pressure per square foot, 12.0 lbs = 50m per hour, 11th, 7 A, N.W.

Maximum velocity for 5 minutes, 36m per hour, 11th, 7 A, N.W.

Prevailing direction, West.

Summary.

| | |
|---|---|
| Southwest | 13 per cent. |
| South Southwest | 10 " " |
| West Northwest | 23 " " |
| West | 10 " " |
| Northwest | 10 " " |
| West Southwest | 10 " " |
| Other directions | 24 " " |

### **Weather.**

| | |
|---|---|
| Mean cloudiness observed | 52 per cent |
| Total cloudiness recorded by the Sun Thermometer | 128 hours = 44 per cent |
| Number of clear days | 9 |
| Number of fair days | 13 |
| Number of cloudy days | 9 |

### **Bright Sunshine.**

Number hours recorded, 166 hrs, = 56 per cent

**Rain.** 1st, 2d, 23d, 24th.

**Snow.** 2d, 3d, 4th, 7th, 8th, 9th, 17th, 29th. 31st.

**Gales.** 35 miles or more per hour [35m., 10th, N.W.;] 50m, 11th, N.W.; 37m, 24th, W.N.W.; 36m, 31st, N.W.

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*Temperature in ground shelter.

**Reduced to freezing and sea-level.

# DAILY SUMMARY.

| Day. | Barometer Reduced to Sea Level. | | | Temperature. Ground Shelter. | | | | | | | No. Hours of Bright Sunshine |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Maximum | Minimum. | Mean. Semi-daily | Maximum | Time. | Minimum. | Time. | Mean of Max. and Min. | Mean Hourly Draper. | Mean Sensible Wet Bulb. | |
| 1 | 30.11 | 29.72 | 29.863 | 53.0 | 12 P | 27.0 | 0 A | 40.0 | 34.3 | 35.0 | 0.0 |
| 2 | 30.07 | 29.67 | 30.020 | 54.0 | 3 A | 32.5 | 12 P | 43.3 | 39.5 | 33.0 | 6.4 |
| 3 | 30.04 | 29.83 | 29.908 | 32.5 | 0 A | 28.0 | 12 P | 30.3 | 30.3 | 28.5 | 3.1 |
| 4 | 30.27 | 29.87 | 30.043 | 28.5 | 0 A | 11.0 | 12 P | 19.7 | 21.8 | 18.7 | 6.7 |
| 5 | 30.50 | 30.27 | 30.483 | 29.0 | 3:30 P | 2.0 | 7:30 A | 15.5 | 14.9 | 8.0 | 8.1 |
| 6 | 30.49 | 30.35 | 30.445 | 27.0 | 4 P | 5.0 | 12 P | 16.0 | 14.5 | 9.3 | 6.5 |
| 7 | 30.49 | 30.26 | 30.403 | 32.0 | 8:30 P | 5.0 | 0 A | 18.5 | 15.7 | 20.5 | 6.0 |
| 8 | 30.26 | 29.90 | 30.048 | 36.5 | 4:30 P | 26.0 | 12 P | 31.3 | 30.5 | 30.5 | 1.5 |
| 9 | 29.90 | 29.50 | 29.655 | 33.5 | 4 P | 20.0 | 12 P | 26.7 | 28.0 | 27.0 | 0.9 |
| 10 | 30.12 | 29.72 | 29.982 | 24.0 | 12 P | −0.5 | 7:30 A | 11.7 | 13.3 | 10.7 | 7.5 |
| 11 | 30.52 | 29.79 | 30.224 | 33.5 | 6:30 A | 1.5 | 12 P | 17.5 | 17.6 | 15.3 | 7.0 |
| 12 | 30.68 | 30.52 | 30.660 | 18.5 | 4 P | −8.5 | 7:30 A | 5.0 | 3.5 | 0.0 | 8.8 |
| 13 | 30.59 | 30.14 | 30.361 | 30.0 | 4:30 P | −4.5 | 7:30 A | 12.7 | 12.5 | 11.5 | 8.0 |
| 14 | 30.14 | 29.84 | 29.935 | 40.0 | 3:30 P | 26.0 | 0 A | 33.0 | 33.1 | 32.5 | 5.6 |
| 15 | 30.03 | 29.80 | 29.933 | 39.0 | 3 P | 25.5 | 12 P | 32.3 | 33.6 | 30.0 | 6.2 |
| 16 | 30.05 | 29.94 | 30.038 | 45.0 | 4 P | 22.5 | 3 A | 33.7 | 33.7 | 28.0 | 8.6 |
| 17 | 30.03 | 29.83 | 29.948 | 45.0 | 3:30 P | 23.0 | 7:30 A | 34.0 | 34.1 | 28.7 | 4.6 |
| 18 | 29.90 | 29.63 | 29.746 | 39.5 | 4:30 P | 26.0 | 8 A | 32.7 | 30.4 | 26.3 | 5.8 |
| 19 | 30.07 | 29.67 | 29.882 | 43.0 | 3 P | 24.0 | 2 A | 33.5 | 34.4 | 32.3 | 6.3 |
| 20 | 30.21 | 30.04 | 30.128 | 45.0 | 4 P | 18.5 | 7:30 A | 31.7 | 31.1 | 24.5 | 8.0 |
| 21 | 30.28 | 30.03 | 30.239 | 40.5 | 3 P | 20.0 | 7:30 A | 30.3 | 30.7 | 26.3 | 6.9 |
| 22 | 30.30 | 30.21 | 30.254 | 38.5 | 9:30 P | 32.0 | 0 A | 35.3 | 34.3 | 33.5 | 0.0 |
| 23 | 30.21 | 29.54 | 29.938 | 39.5 | 5 A | 34.0 | 9:30 P | 36.7 | 36.3 | 34.7 | 0.0 |
| 24 | 29.72 | 29.33 | 29.511 | 39.5 | 9 A | 23.5 | 12 P | 31.5 | 31.6 | 28.3 | 0.8 |
| 25 | 29.92 | 29.72 | 29.882 | 40.5 | 3:30 P | 22.0 | 7 A | 31.3 | 29.6 | 25.7 | 9.1 |
| 26 | 29.86 | 29.66 | 29.854 | 45.0 | 4 P | 25.0 | 7:30 A | 35.0 | 33.1 | 28.5 | 7.5 |
| 27 | 29.95 | 29.75 | 29.878 | 38.5 | 11 A | 30.0 | 6:30 A | 34.3 | 36.0 | 34.3 | 4.0 |
| 28 | 29.98 | 29.73 | 29.879 | 47.0 | 3 P | 29.5 | 7:30 A | 38.7 | 36.3 | 30.0 | 8.2 |
| 29 | 29.75 | 29.58 | 29.670 | 38.5 | 4 P | 30.0 | 8 A | 34.3 | 32.5 | 28.0 | 3.3 |
| 30 | 29.85 | 29.69 | 29.774 | 37.0 | 4 P | 29.0 | 5 A | 33.0 | 33.7 | 30.3 | 8.0 |
| 31 | 29.82 | 29.69 | 29.751 | 36.0 | 2 A | 21.5 | 12 P | 28.7 | 30.6 | 26.7 | 8.5 |

# DAILY SUMMARY.

| Day. | Humidity. | | | Wind. | | | | | Precipitation. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Mean Dew Point. | Mean Force vapor. | Mean Relative Humidit | Prevailing Direction. | Total Movement in Miles. | Maximum Pressure Per Square Ft | Miles per Hour. | Time. | Beginning. | Ending. | Total in Inches. | |
| | | | | | | | | | | | Rain.** | Snow. |
| 1 | 34.0 | .209 | 97.5 | W. | 10 | 2.0 | 20 | 12 P | 1 A | 12 P | .46 | |
| 2 | 29.5 | .213 | 77.5 | N.W. | 224 | 2.5 | 22 | 4 A | 0 A | 12 P | .19 | ½ |
| 3 | 25.5 | .164 | 87.0 | N. | 158 | 1.5 | 17 | 10 A | 0 A | 11 A | .30 | 5 |
| 4 | 12.5 | .115 | 73.0 | N.W. | 178 | 3.0 | 24 | 1 P | 6 A | 10:30 A | .05 | ¼ |
| 5 | 3.0 | .070 | 74.0 | S.W. | 54 | 0.5 | 10 | 11 P | | | | |
| 6 | 6.5 | .072 | 84.0 | N. | 153 | 2.0 | 20 | 6 P | | | | |
| 7 | 18.5 | .125 | 91.0 | W. | 53 | 1.0 | 14 | 8 P | 8 A | 11 A | T | |
| 8 | 28.0 | .180 | 85.5 | S.S.W. | 180 | 1.5 | 17 | 7 A | 6 A | 11 A | .04 | ¼ |
| 9 | 23.5 | .158 | 84.0 | S.W. | 136 | 5.5 | 33 | 11 P | 1 P | 3 P | | T |
| 10 | 6.0 | .084 | 76.5 | S.W. | 314 | 6.0 | 35 | 3 A | | | | |
| 11 | 9.5 | .108 | 72.0 | N.N.W. | 355 | 12.5 | 50 | 7 A | | | | |
| 12 | −3.0 | .047 | 85.0 | W.S.W. | 61 | 0.5 | 10 | 0 A | | | | |
| 13 | 15.0 | .094 | 86.5 | W.S.W. | 37 | 1.5 | 17 | 8 P | | | | |
| 14 | 30.0 | .195 | 85.5 | S. | 100 | 0.5 | 10 | 3 A | | | | |
| 15 | 26.0 | .183 | 77.0 | W.N.W. | 252 | 4.5 | 30 | 5 P | | | | |
| 16 | 22.0 | .175 | 70.0 | W.S.W. | 215 | 3.0 | 24 | 2 P | | | | |
| 17 | 24.0 | .184 | 74.0 | S.S.E. | 109 | 2.5 | 22 | 6 A | 11:30 A | 12 M | | T |
| 18 | 22.0 | .155 | 78.0 | N.W. | 21 | 0.0 | — | — | | | | |
| 19 | 25.5 | .267 | 71.0 | W.N.W. | 152 | 3.0 | 24 | 11 A | | | | |
| 20 | 19.5 | .149 | 76.0 | S.S.W. | 104 | 1.0 | 14 | 6 P | | | | |
| 21 | 23.5 | .152 | 86.5 | S.S.E | 61 | 0.0 | — | — | | | | |
| 22 | 30.5 | .204 | 86.0 | S. | 65 | 0.5 | 10 | 5 P | | | | |
| 23 | 33.5 | .206 | 95.5 | S.S.W. | 44 | 0.0 | — | — | 8 A | 12 P | .83 | |
| 24 | 23.5 | .181 | 73.5 | N.N.W. | 273 | 7.0 | 37 | 12 M | 0 A | 2 A | .13 | |
| 25 | 22.5 | .150 | 83.0 | W.N.W. | 193 | 2.5 | 22 | 2 A | | | | |
| 26 | 24.0 | .175 | 74.5 | W. | 46 | 2.5 | 22 | 6 P | | | | |
| 27 | 30.0 | .216 | 77.5 | W.N.W. | 339 | 5.0 | 32 | 10 A | | | | |
| 28 | 22.5 | .193 | 66.5 | S.W. | 117 | 1.0 | 14 | 2 A | | | | |
| 29 | 22.0 | .172 | 71.5 | W.N.W. | 45 | 1.0 | 14 | 11 P | 8 A | 8:30 A | T | T |
| 30 | 24.0 | .193 | 69.0 | W.N.W. | 192 | 2.0 | 14 | 1 P | | | | |
| 31 | 21.5 | .160 | 75.0 | W.N.W. | 313 | 6.5 | 36 | 6 P | 10 A | 10 P | .02 | ¼ |

**Rain or melted snow at base of tower. *Included in following day.

## REMARKS

The weather during the month presented a marked contrast to that of a year ago, when such abnormally low temperature prevailed. While the month was not as cold as usual it was not marked by any especially warm periods. Zero weather was noted on two dates near the middle of the month.

The precipitation was much less than the normal. A rain storm followed by about six inches of snow occurred the first part of the month. The snow remained until a rather heavy rain storm on the 23d, which was practically the last storm of the month.

The record of the several weather elements compared with the normals shows the following features of interest : The mean barometer was rather low and the range of pressure less than usual. The pressure during the last half of the month was considerably lower than during the first half. The record for the month was during the high barometer on the 12th. The maximum pressure was slightly less than the normal and the minimum pressure was comparatively high.

The mean temperature was more than three degrees above the normal, and the range a little greater than usual. The minimum temperature was slightly lower than the average value for this feature.

The mean dew point and relative humidity were both higher than usual.

The total precipitation was about sixty per cent of the normal, and comparatively little of it occurred as snow.

The total wind movement was below the average, and but few gales were noted. Much of the wind was from a westerly direction.

The amount of sunshine was considerably greater than usual.

J. E. OSTRANDER, Meteorologist.

A. L. CHANDLER, Observer.

BULLETIN No. 362. FEBRUARY, 1919

# Meteorological Observations
AT THE
# MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.
*Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.*
*Height of Wind Instruments 72 ft. Time used, 75th Mer.*

## MONTHLY SUMMARY.

### **Pressure.** In inches.

| | |
|---|---|
| Maximum reduced to freezing | 30.11, 20th, 9 A |
| Minimum reduced to freezing | 28.96, 15th, 2 P |
| Reduced maximum reading | 30.43, 20th, 9 A |
| Reduced minimum reading | 29.27, 15th, 2 P |
| Mean semi-daily reduced | 29.963 |
| Monthly range | 1.16 |

### ***Air Temperature.** In Degrees Fahr.

| | |
|---|---|
| Highest | 49.0, 13th, 3 P |
| Lowest | 8.5, 11th, 7:30A |
| Mean hourly | 28.4 |
| Mean of means of max. and min. | 28.7 |
| Mean sensible (wet bulb) | 24.2 |
| Monthly range | 40.5 |
| Highest mean daily | 36.5, 24th |
| Lowest mean daily | 19.7, 11 h |
| Mean maximum | 37.4 |
| Mean minimum | 20.0 |
| Mean daily range | 17.4 |
| Greatest daily range | 36.0, 13th |
| Least daily range | 4.0, 14th |

### **Humidity.**

| | |
|---|---|
| Mean dew point | 20.2 |
| Mean force of vapor | .149 |
| Mean relative humidity | 78.6 |

### **Precipitation.** In inches.

| | |
|---|---|
| Total precipitation, in inches | 2.80 |
| Total snow, in inches | 11½ |
| Number of days on which .01 inch or more rain fell | 8 |

Days of sleighing, 3

### **Wind.**

| | |
|---|---|
| Total movement | 5031 m |
| Greatest daily movement | 430m, 19th |
| Least daily movement | 26m, 13th |
| Mean daily movement | 180m |
| Mean hourly velocity | 7.5 m |

Maximum pressure per square foot, 8.5 lbs 41m per hour, 24th, 10A, W.N.W.

Maximum velocity for 5 minutes, 30m per hour, 24th, 10A, W.N.W.

Prevailing direction, Northwest.

Summary.

| | |
|---|---|
| Northwest | 29 per cent |
| North Northwest | 21 " " |
| North | 14 " " |
| West Northwest | 11 " " |
| Other directions | 25 " " |

### **Weather.**

| | |
|---|---|
| Mean cloudiness observed | 38 per cent |
| Total cloudiness recorded by the Sun Thermometer | 80 hours = 27 per cent |
| Number of clear days | 17 |
| Number of fair days | 7 |
| Number of cloudy days | 4 |

### **Bright Sunshine.**

Number hours recorded, 216 hrs. = 73 per cent

**Rain.** 4th, 14th, 25th, 26th, 28th.

**Snow.** 4th, 14th, 21st, 22d, 23d, 25th.26th.

**Hail.** 14th.

**Gales.** 35 miles or more per hour: 39m., 1st, N.N.W.: 35m, 2d, N.W.: 35m, 18th, N.N.W.: 40m, 19th, N.W.: 41m, 24th, W.N.W.

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*Temperature in ground shelter.

**Reduced to freezing and sea-level.

# DAILY SUMMARY.

| Day. | Barometer Reduced to Sea Level. | | | Temperature. Ground Shelter. | | | | | | | No. Hours of Bright Sunshine |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Maximum | Minimum. | Mean. Semi-daily | Maximum | Time. | Minimum. | Time. | Mean of Max. and Min. | Mean Hourly Draper. | Mean Sensible Wet Bulb. | |
| 1 | 29.86 | 29.77 | 29.838 | 31.0 | 4 P | 17.0 | 7:30 A | 24.0 | 23.5 | 19.7 | 9.5 |
| 2 | 30.10 | 29.84 | 29.994 | 40.0 | 3:30 P | 21.5 | 0 A | 30.8 | 28.4 | 23.7 | 9.0 |
| 3 | 30.17 | 30.07 | 30.120 | 47.0 | 4:30 P | 19.5 | 6 A | 33.3 | 29.8 | 23.7 | 8.5 |
| 4 | 30.07 | 29.72 | 29.888 | 36.5 | 6:30 P | 18.5 | 7:30 A | 27.5 | 27.9 | 26.7 | 6.3 |
| 5 | 29.81 | 29.68 | 29.770 | 37.0 | 12 M | 23.5 | 12 P | 29.7 | 31.1 | 26.5 | 9.2 |
| 6 | 29.91 | 29.81 | 29.895 | 33.5 | 2:30 P | 17.0 | 7:30 A | 25.3 | 26.3 | 23.3 | 8.5 |
| 7 | 30.10 | 29.91 | 30.062 | 37.0 | 3:30 P | 22.5 | 6 A | 29.7 | 28.8 | 24.3 | 9.3 |
| 8 | 30.12 | 29.97 | 30.052 | 36.0 | 3:30 P | 17.5 | 5:30 A | 26.7 | 27.0 | 24.5 | 7.0 |
| 9 | 30.01 | 29.93 | 30.005 | 36.5 | 3:30 P | 19.0 | 12 P | 27.7 | 26.5 | 20.3 | 9.4 |
| 10 | 30.04 | 29.92 | 30.036 | 31.0 | 4:30 P | 15.0 | 7 A | 23.0 | 21.5 | 17.7 | 9.5 |
| 11 | 30.12 | 29.97 | 30.086 | 33.5 | 4 P | 8.5 | 7:30 A | 21.0 | 19.7 | 14.5 | 9.9 |
| 12 | 30.05 | 29.91 | 30.000 | 40.0 | 4 P | 9.0 | 7 A | 24.5 | 21.9 | 16.7 | 9.0 |
| 13 | 30.02 | 29.88 | 29.969 | 49.0 | 3 P | 13.0 | 7:30 A | 31.0 | 30.9 | 23.0 | 9.1 |
| 14 | 29.90 | 29.37 | 29.558 | 35.0 | 3 P | 31.0 | 7 A | 33.0 | 33.2 | 32.0 | 0.0 |
| 15 | 29.38 | 29.27 | 29.325 | 39.0 | 4 P | 32.0 | 8 A | 35.5 | 34.9 | 32.7 | 3.0 |
| 16 | 29.74 | 29.38 | 29.629 | 37.5 | 0 A | 23.5 | 5 P | 30.5 | 30.9 | 25.3 | 7.7 |
| 17 | 29.88 | 29.74 | 29.825 | 35.5 | 2:30 P | 20.0 | 7:30 A | 27.7 | 27.0 | 23.5 | 10.0 |
| 18 | 30.02 | 29.79 | 29.900 | 36.0 | 3 P | 20.0 | 7:30 A | 28.0 | 26.8 | 23.7 | 8.5 |
| 19 | 30.33 | 30.02 | 30.250 | 35.0 | 3:30 P | 18.0 | 7:30 A | 26.5 | 23.9 | 20.0 | 10.2 |
| 20 | 30.43 | 30.28 | 30.370 | 41.5 | 3:30 P | 13.5 | 7:30 A | 27.5 | 27.9 | 24.0 | 10.3 |
| 21 | 30.32 | 30.10 | 30.244 | 30.0 | 12 M | 21.0 | 6:30 A | 25.5 | 26.2 | 23.7 | 3.5 |
| 22 | 30.20 | 30.00 | 30.109 | 38.5 | 2:30 P | 27.0 | 0 A | 32.7 | 32.7 | 31.7 | 6.9 |
| 23 | 30.00 | 29.67 | 29.741 | 40.0 | 9 P | 32.0 | 7 A | 36.0 | 35.3 | 33.5 | 6.8 |
| 24 | 30.15 | 29.77 | 30.034 | 42.5 | 3:30 P | 27.5 | 12 P | 35.0 | 36.5 | 31.3 | 9.1 |
| 25 | 30.17 | 29.67 | 30.004 | 39.0 | 5 P | 18.0 | 7 A | 28.5 | 30.2 | 27.3 | 7.6 |
| 26 | 30.20 | 29.57 | 29.829 | 35.5 | 0 A | 19.5 | 12 P | 27.5 | 28.7 | 24.5 | 8.2 |
| 27 | 30.25 | 30.20 | 30.233 | 32.0 | 4:30 P | 14.0 | 7 A | 23.0 | 22.8 | 19.3 | 9.1 |
| 28 | 30.27 | 29.96 | 30.188 | 43.0 | 12 P | 20.5 | 6 A | 31.7 | 33.6 | 20.0 | 1.4 |

# DAILY SUMMARY.

| Day. | Humidity. | | | Wind. | | | | | Precipitation. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Mean Dew Point. | Mean Force vapor. | Mean Relative Humidit | Prevailing Direction. | Total Movement in Miles. | Maximum Pressure Per Square Ft | Miles per Hour. | Time. | Beginning. | Ending. | Total in Inches. | |
| | | | | | | | | | | | Rain.** | Snow. |
| 1 | 14.0 | .119 | 74.5 | N.W. | 332 | 7.5 | 39 | 4 P | | | | |
| 2 | 18.5 | .142 | 71.0 | N.N.W. | 324 | 6 0 | 35 | 1 A | | | | |
| 3 | 17.0 | .145 | 69.0 | N.N.W. | 125 | 1.5 | 17 | 7 A | | | | |
| 4 | 24.5 | .156 | 88.0 | N.N.W. | 42 | 1.0 | 14 | 7 P | 2:30 P | 9 P | .02 | T |
| 5 | 21.5 | .162 | 72.5 | N.W. | 252 | 4.0 | 28 | 1 P | | | | |
| 6 | 20.5 | .135 | 84.5 | W.N.W. | 165 | 4.0 | 28 | 11 A | | | | |
| 7 | 21.5 | .138 | 85.0 | W.N.W | 148 | 2 0 | 20 | 12 M | | | | |
| 8 | 21.5 | .143 | 85.0 | S W. | 55 | 0.0 | — | — | | | | |
| 9 | 16.5 | .118 | 79.5 | N.N.W. | 165 | 2.5 | 22 | 11 A | | | | |
| 10 | 14.5 | .106 | 81.5 | N. | 291 | 4.0 | 28 | 12 M | | | | |
| 11 | 10.0 | .093 | 80.0 | N. | 131 | 2.5 | 22 | 12 M | | | | |
| 12 | 10.0 | .107 | 66.5 | W.N.W. | 43 | 0.5 | 10 | 4 P | | | | |
| 13 | 15.5 | .148 | 66 0 | E.S.E. | 26 | 0.5 | 10 | 9 P | | | | |
| 14 | 30.0 | .188 | 90.0 | E.N E. | 77 | 0 0 | — | — | 2 A | 6 P | .56 | ½ |
| 15 | 29.5 | .196 | 86.0 | N. | 52 | 0.0 | — | — | | | | |
| 16 | 19.0 | .154 | 67.0 | N.W. | 334 | 4.5 | 30 | 1 P | | | | |
| 17 | 19.0 | .137 | 76 0 | N.W. | 319 | 4.5 | 30 | 1 P | | | | |
| 18 | 19.5 | .139 | 79.5 | N.N.W. | 167 | 6.0 | 35 | 10 P | | | | |
| 19 | 14.5 | .118 | 73.0 | N.W. | 430 | 8.0 | 40 | 4 P | | | | |
| 20 | 19.5 | .142 | 79 0 | N. | 194 | 3 5 | 26 | 2 P | | | | |
| 21 | 19.5 | .138 | 81.0 | N.N.W. | 65 | 0.5 | 10 | 10 A | 1 P | 12 P | .20 | 3 |
| 22 | 30.0 | .184 | 93.0 | S.E. | 76 | 1.0 | 14 | 7 P | 0 A | 4 A | .12 | 1½ |
| 23 | 29.0 | .213 | 79.0 | N.W. | 137 | 4 0 | 28 | 7 P | 4 A | 12 M | 96 | 6 |
| 24 | 23.5 | .205 | 61.5 | N.W. | 406 | 8.5 | 41 | 10 A | | | | |
| 25 | 22.0 | .170 | 75.5 | S.S.W. | 61 | 1.0 | 14 | 6 P | 7:30 P | 12 P | .46 | ¼ |
| 26 | 20 5 | .148 | 76 5 | N.W. | 320 | 5 5 | 33 | 4 P | 0 A | 4 A | .42 | ¼ |
| 27 | 14.5 | .116 | 75.0 | W | 173 | 2.0 | 20 | 2 P | | | | |
| 28 | 31.0 | .219 | 86.0 | S.S.W. | 121 | 1.0 | 14 | 12 M | 5 P | 12 P | .06 | |

**Rain or melted snow at base of tower.

*Included in following day.

## REMARKS

During the month of February the weather was generally pleasant with an unsually large number of bright sunshining days. Only four days were classed as cloudy, and more than one half the days were clear. No zero weather was noted and the temperature was considerably above the normal. The ground was practically free from snow until the last week of the month. The precepitation was very small until the last week, when a considerable amount occurred.

The records of the several weather elements show the following features of interest: The mean borometer was low for mid-winter, and the range considerably less than the normal. The maximum pressure was considerably lower than the normal for this feature. The total wind movement was slightly more that the normal, and the direction was from the northwest quadrant most of the time.

The mean temperature was above four degrees higher than the normal, and the range only about two-thirds of the normal amount. This was largely due to the fact that the minimum temperature was nearly seventeen degrees higher than the average value for this feature. The period between the maximum and minimum temperatures of the month was less than two and one-half days.

The mean dew point was about three degrees above the normal, and the relative humidity was nearly normal.

The total precipitation was about one-half an inch less than the normal, and the greater part occurred as rain. A heavy snow fall occurred during the last week of the month, but it melted rapidly, so that there was but little sleighing.

The number of hours of sunshine recorded was greater than any previous record for February at this station.

The month closed with a drizzling rain in progress, and a rather high temperature.

J. E. OSTRANDER, Meteorologist.

A. L. CHANDLER, Observer.

BULLETIN No. 363. MARCH, 1919

# Meteorological Observations
AT THE
# MASSACHUSETTS
# AGRICULTURAL EXPERIMENT
# STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.
*Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.*
*Height of Wind Instruments 72 ft. Time used, 75th Mer.*

## MONTHLY SUMMARY.

**Pressure.** In inches.

| | |
|---|---|
| Maximum reduced to freezing | 30.61, 15th, 8 A |
| Minimum reduced to freezing | 28.89, 28th, 12 M |
| Reduced maximum reading | 30.92, 15th, 8 A |
| Reduced minimum reading | 29.20, 28th, 12 M |
| Mean semi-daily reduced | 30.115 |
| Monthly range | 1.72 |

***Air Temperature.** In Degrees Fahr.

| | |
|---|---|
| Highest | 68.0, 21st, 3 P |
| Lowest | 12.0, 14th, 7A |
| Mean hourly | 37.8 |
| Mean of means of max. and min. | 38.5 |
| Mean sensible (wet bulb) | 33.[illegible] |
| Monthly range | 56.0 |
| Highest mean daily | 55.6, 21st |
| Lowest mean daily | 23.5, 29th |
| Mean maximum | 48.1 |
| Mean minimum | 28.8 |
| Mean daily range | 19.3 |
| Greatest daily range | 38.5, 26th |
| Least daily range | 4.5, 16th |

**Humidity.**

| | |
|---|---|
| Mean dew point | 26.8 |
| Mean force of vapor | .226 |
| Mean relative humidity | 70.6 |

**Precipitation.** In inches.

| | |
|---|---|
| Total precipitation, in inches | 4.22 |
| Total snow, in inches | 2.0 |
| Number of days on which .01 inch or more rain fell | 11 |

Days of sleighing, None

**Wind.**

| | |
|---|---|
| Total movement | 7361 m |
| Greatest daily movement | 580m, 29th |
| Least daily movement | 27m, 17th |
| Mean daily movement | 237m |
| Mean hourly velocity | 9.9 m |

Maximum pressure per square foot, 14.0 lbs 53m per hour, 28th, 10P, N.W.

Maximum velocity for 5 minutes, 30m per hour, 28th, 7P. N.W.

Prevailing direction, Northwest.

Summary.

| | |
|---|---|
| Northwest | 10 per cent |
| North Northwest | 13 " " |
| North | 19 " " |
| West Northwest | 13 " " |
| South Southwest | 10 " " |
| Other directions | 35 " " |

**Weather.**

| | |
|---|---|
| Mean cloudiness observed | 51 per cent |
| Total cloudiness recorded by the Sun Thermometer | 139 hours = 37 per cent. |
| Number of clear days | 12 |
| Number of fair days | 12 |
| Number of cloudy days | 7 |

**Bright Sunshine.**

Number hours recorded, 232 hrs, = 63 per cent.

**Rain.** 1st, 5th, 9th, 16th, 17th, 18th, 19th, 27th, 28th, 29th, 31st.

**Snow.** 16th, 28th, 29th, 30th, 31st.

**Hail.** 28th.

**Gales.** 35 miles or more per hour: 39m., 1st, S.W.; 45m, 10th, W.N.W.; 36m, 22d, N.: 53m, 28th, N.W.: 47m, 29th, N.W.

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*Temperature in ground shelter.

**Reduced to freezing and sea-level.

# DAILY SUMMARY.

| Day. | Barometer Reduced to Sea Level. | | | Temperature. Ground Shelter. | | | | | | | | No. Hours of Bright Sunshine |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Maximum | Minimum. | Mean. Semi-daily | Maximum | Time. | Minimum. | Time. | Mean of Max. and Min. | Mean Hourly Draper. | Mean Sensible Wet Bulb. | |
| 1 | 30.14 | 29.78 | 29.975 | 50.5 | 12 M | 30.5 | 12 P | 40.5 | 43.0 | 38.5 | 6.2 |
| 2 | 30.22 | 30.07 | 30.172 | 46.5 | 5 P | 23.5 | 7:30 A | 35.0 | 32.5 | 27.7 | 10.6 |
| 3 | 30.18 | 30.05 | 30.155 | 53.5 | 4 P | 26.0 | 7:30 A | 39.7 | 36.5 | 32.0 | 9.9 |
| 4 | 30.18 | 29.85 | 30.044 | 57.0 | 3 P | 27.5 | 7:30 A | 42.3 | 39.8 | 34.0 | 10.1 |
| 5 | 29.85 | 29.55 | 29.659 | 54.5 | 3:30 P | 38.0 | 7 A | 46.3 | 46.2 | 42.5 | 7.8 |
| 6 | 30.26 | 29.66 | 30.125 | 42.5 | 4 P | 25.0 | 7:30 A | 33.7 | 33.6 | 26.7 | 10.9 |
| 7 | 30.36 | 30.23 | 30.319 | 41.0 | 3 P | 22.0 | 5 A | 31.5 | 30.9 | 26.0 | 6.5 |
| 8 | 30.58 | 30.36 | 30.522 | 51.0 | 4 P | 26.0 | 7:30 A | 38.5 | 36.3 | 32.7 | 9.8 |
| 9 | 30.46 | 29.46 | 29.767 | 43.0 | 12 P | 31.5 | 3 A | 37.3 | 36.2 | 35.5 | 0.0 |
| 10 | 30.04 | 29.47 | 29.887 | 43.0 | 4 P | 33.5 | 12 P | 38.3 | 38.8 | 32.7 | 8.7 |
| 11 | 30.17 | 29.96 | 30.075 | 45.0 | 3 P | 31.0 | 6 A | 38.0 | 35.8 | 30.7 | 5.5 |
| 12 | 30.31 | 30.07 | 30.210 | 51.0 | 4:30 P | 27.0 | 6:30 A | 39.0 | 39.5 | 32.7 | 11.0 |
| 13 | 30.59 | 30.03 | 30.334 | 48.0 | 9 A | 22.0 | 12 P | 35.0 | 36.1 | 30.5 | 8.3 |
| 14 | 30.79 | 30.59 | 30.761 | 37.0 | 4:30 P | 12.0 | 7 A | 24.5 | 23.8 | 18.0 | 10.3 |
| 15 | 30.92 | 30.79 | 30.862 | 45.0 | 4 P | 15.0 | 6:30 A | 30.0 | 30.9 | 27.7 | 10.3 |
| 16 | 30.83 | 30.61 | 30.732 | 33.0 | 0 A | 28.5 | 7 A | 30.7 | 31.3 | 30.5 | 0.3 |
| 17 | 30.61 | 30.14 | 30.322 | 37.0 | 3:30 P | 32.0 | 0 A | 34.5 | 33.7 | 31.7 | 3.3 |
| 18 | 30.14 | 29.92 | 29.974 | 46.5 | 3 P | 32.0 | 2 A | 39.3 | 38.5 | 36.0 | 0.2 |
| 19 | 30.40 | 30.11 | 30.252 | 40.5 | 8:30 P | 35.0 | 10:30 A | 37.7 | 37.6 | 37.0 | 0.0 |
| 20 | 30.40 | 30.30 | 30.348 | 62.5 | 3 P | 38.0 | 5 A | 50.3 | 50.2 | 41.7 | 9.7 |
| 21 | 30.30 | 30.12 | 30.166 | 68.0 | 3 P | 46.0 | 12 P | 57.0 | 55.6 | 47.5 | 11.0 |
| 22 | 30.20 | 30.16 | 30.189 | 51.0 | 3 P | 35.0 | 12 P | 43.0 | 41.5 | 33.7 | 9.2 |
| 23 | 30.21 | 29.99 | 30.030 | 46.0 | 2 P | 33.0 | 3 A | 39.5 | 39.8 | 37.0 | 8.5 |
| 24 | 30.21 | 30.00 | 30.118 | 54.0 | 3 P | 35.5 | 12 P | 44.7 | 44.6 | 33.3 | 11.9 |
| 25 | 30.27 | 30.14 | 30.222 | 61.0 | 5 P | 26.0 | 6:30 A | 43.5 | 42.8 | 33.5 | 11.7 |
| 26 | 30.22 | 29.95 | 30.075 | 66.5 | 3:30 P | 28.0 | 6:30 A | 47.3 | 46.4 | 40.0 | 9.3 |
| 27 | 30.02 | 29.52 | 29.742 | 62.5 | 2:30 P | 42.0 | 7:30 A | 52.3 | 51.5 | 45.7 | 4.6 |
| 28 | 29.52 | 29.20 | 29.401 | 53.0 | 2 A | 20.0 | 7:30 P | 36.5 | 31.7 | 26.5 | 0.0 |
| 29 | 29.80 | 29.49 | 29.688 | 26.0 | 12 P | 19.5 | 7:30 A | 22.7 | 23.5 | 23.0 | 8.6 |
| 30 | 29.77 | 29.67 | 29.738 | 37.0 | 2 P | 26.0 | 0 A | 31.5 | 31.7 | 31.5 | 8.3 |
| 31 | 29.74 | 29.67 | 29.708 | 38.0 | 3 P | 27.0 | 12 P | 32.5 | 32.0 | 27.5 | 9.5 |

# DAILY SUMMARY.

| Day. | Humidity. | | | Wind. | | | | | Precipitation. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Mean Dew Point. | Mean Force vapor. | Mean Relative Humidit | Prevailing Direction. | Total Movement in Miles. | Maximum Pressure Per Square Ft | Miles per Hour. | Time. | Beginning. | Ending. | Total in Inches. Rain.** | Total in Inches. Snow. |
| 1 | 37.0 | .265 | 86.0 | W.N.W. | 286 | 7.5 | 39 | 7 A | 0 A | 9 A | .6 | |
| 2 | 22.0 | .169 | 71.5 | W.N.W. | 78 | 0.0 | — | — | | | | |
| 3 | 28.5 | .199 | 81.5 | W. | 55 | 0.5 | 10 | 10 A | | | | |
| 4 | 28.0 | .232 | 68.0 | S.W. | 167 | 3.5 | 26 | 5 P | | | | |
| 5 | 40.5 | .301 | 83.0 | S.S.W. | 215 | 2.0 | 20 | 5 P | 9 P | 12 P | .02 | |
| 6 | 19.0 | .167 | 63.5 | N.N.W. | 238 | 3.0 | 24 | 7 A | | | | |
| 7 | 20.5 | .162 | 71.0 | E.S.E. | 113 | 0.0 | — | — | | | | |
| 8 | 29.0 | .203 | 79.5 | W.S.W. | 101 | 0.5 | 10 | 9 P | | | | |
| 9 | 34.0 | .214 | 91.0 | N.E. | 139 | 1.5 | 17 | 12 P | 2 A | 6 P | .43 | |
| 10 | 25.0 | .222 | 60.5 | W.N.W. | 438 | 10.0 | 45 | 10 A | | | | |
| 11 | 23.5 | .202 | 63.5 | N.W. | 135 | 3.0 | 24 | 4 P | | | | |
| 12 | 20.5 | .238 | 49.5 | W S.W. | 202 | 3.0 | 24 | 11 A | | | | |
| 13 | 21.0 | .225 | 57.0 | N.N.W. | 355 | 3.5 | 26 | 6 A | | | | |
| 14 | 10.5 | .116 | 65.0 | N. | 277 | 3.0 | 24 | 9 A | | | | |
| 15 | 18.0 | .184 | 56.0 | S.W. | 132 | 0.5 | 10 | 3 P | | | | |
| 16 | 28.0 | .177 | 90.0 | SS.E. | 105 | 0.0 | — | — | 1 A | 12 P | .26 | ¾ |
| 17 | 28.5 | .190 | 83.0 | S.S.E. | 27 | 0.0 | — | — | 0 A | 12 P | 52 | |
| 18 | 32.5 | .230 | 82.0 | N.E. | 81 | 3.0 | 24 | 7 P | 0 A | 5 P | .13 | |
| 19 | 35.0 | .232 | 89.5 | N. | 323 | 4.5 | 30 | 7 A | 8 A | 9 P | .21 | |
| 20 | 32.5 | .347 | 59.0 | N.N.E | 247 | 2.5 | 22 | 2 P | | | | |
| 21 | 38.5 | .439 | 53.5 | N. | 247 | 2.5 | 22 | 7 P | | | | |
| 22 | 27.5 | .224 | 67.5 | N. | 514 | 6.5 | 36 | 7 P | | | | |
| 23 | 30.0 | .256 | 65.0 | N. | 451 | 4.0 | 28 | 9 A | | | | |
| 24 | 17.0 | .256 | 38.5 | N. | 426 | 4.5 | 30 | 7 A | | | | |
| 25 | 15.5 | .271 | 36.5 | N.W. | 112 | 1.0 | 14 | 4 P | | | | |
| 26 | 31.5 | .304 | 62.5 | W.S.W. | 80 | 1.5 | 17 | 6 P | | | | |
| 27 | 41.5 | .351 | 78.0 | S. | 183 | 4.5 | 30 | 1 P | 6 P | 12 P | .15 | |
| 28 | 25.5 | .148 | 97.5 | W.N.W. | 419 | 14.0 | 53 | 10 P | 0 A | 12 P | 1.80 | ¾ |
| 29 | 20.5 | .129 | 87.5 | N.N.W. | 580 | 11.0 | 47 | 5 A | 0 A | 6 A | .05 | ¼ |
| 30 | 29.0 | .186 | 85.0 | N.W. | 416 | 3.0 | 24 | 8 A | 11 A | | | T |
| 31 | 21.5 | .169 | 68.5 | N.N.W. | 319 | 3.0 | 24 | 5 A | 0 A | 4 A | .02 | ¼ |

**Rain or melted snow at base of tower.        *Included in following day.

## REMARKS

The weather during the month was seasonal in most respects, and the transition from winter to spring was fairly complete. Early in the month the snow had disappeared and the frost soon after left the ground, so that at the equinoctial date plowing could have been done on the light soils. Later in the month heavy rains and colder weather made the conditions for spring work on the soil less favorable. The last part of the month was colder than the beginning of the month. The last few days of the month were marked by heavy winds and stormy conditions.

The records of the several weather elements show the following features of interest: The mean barometer was abnormally high, even for March, and the range of pressure was very large. Owing to the large fluctuations in pressure, the total wind movement was much greater than the normal, and much of the high wind was from the northwest quadrant. The maximum barometric pressure was very high, for this station.

The mean temperature was more than three degrees higher than usual, and the maximum was nearly six degrees above the normal for this feature. The coldest day was near the end of the month.

The mean dew point was nearly normal, and the relative humidity about four points lower than usual.

The total precipitation was slightly more than the normal, and nearly one-half the amount fell during the heavy storm on the 27th to 29th. During the first half the month the precipitation was rather light.

The amount of bright sunshine was considerably more than the normal.

J. E. OSTRANDER, Meteorologist.

A. L. CHANDLER, Observer.

**BULLETIN No. 364. APRIL, 1919**

# Meteorological Observations
AT THE
# MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.
*Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.*
*Height of Wind Instruments 72 ft. Time used, 75th Mer.*

## MONTHLY SUMMARY.

### **Pressure.** In inches.

| | |
|---|---|
| Maximum reduced to freezing | 30.07, 22d, 9 A |
| Minimum reduced to freezing | 29.33, 26th, 3 A |
| Reduced maximum reading | 30.37,,22d 9 A |
| Reduced minimum reading | 29.65, 26th, 3 A |
| Mean semi-daily reduced | 30.029 |
| Monthly range | 0.72 |

### ***Air Temperature.** In Degrees Fahr.

| | |
|---|---|
| Highest | 74.0, 23d, 4-30 P |
| Lowest | 18.0, 2d, 3 A |
| Mean hourly | 45.4 |
| Mean of means of max. and min. | 45.7 |
| Mean sensible (wet bulb) | 40.2 |
| Monthly range | 56.0 |
| Highest mean daily | 56.0, 23d |
| Lowest mean daily | 25.5, 1st |
| Mean maximum | 55.9 |
| Mean minimum | 35.4 |
| Mean daily range | 20.5 |
| Greatest daily range | 38.5, 23d |
| Least daily range | 6.5, 10th |

### **Humidity.**

| | |
|---|---|
| Mean dew point | 34.0 |
| Mean force of vapor | .307 |
| Mean relative humidity | 68.1 |

### **Precipitation.** In inches.

| | |
|---|---|
| Total precipitation, in inches | 2.37 |
| Total snow, in inches | Trace |
| Number of days on which .01 inch or more rain fell | 10 |

*Temperature in ground shelter.
**Reduced to freezing and sea-level.

### **Wind.**

| | |
|---|---|
| Total movement | 5374 m |
| Greatest daily movement | 468m, 25th |
| Least daily movement | 50m, 5th |
| Mean daily movement | 179m |
| Mean hourly velocity | 7.5 m |

Maximum pressure per square foot, 9.5 lbs 44m per hour, 25th, 3P, W.N.W.

Maximum velocity for 5 minutes, 32m per hour, 11th, 3P, S.S.W.

Prevailing direction, West Northwest.

Summary.

| | |
|---|---|
| Northwest | 20 per cent |
| West | 13 " " |
| South | 10 " " |
| North Northwest | 10 " " |
| North | 13 " " |
| West Northwest | 10 " " |
| South Southwest | 10 " " |
| Other directions | 14 " " |

### **Weather.**

| | |
|---|---|
| Mean cloudiness observed | 50 per cent |
| Total cloudiness recorded by the Sun Thermometer | 153 hours = 38 per cent. |
| Number of clear days | 13 |
| Number of fair days | 11 |
| Number of cloudy days | 6 |

### **Bright Sunshine.**

Number hours recorded, 249 hrs.= 62 per cent.

**Rain,** 5th, 7th, 8th, 9th, 10th, 11th, 12th, 16th, 24th, 28th, 29th.

**Snow,** 25th.

**Frost,** 1st. 2d, 3d, 15th, 19th, 22d, 24th, 25th, 26th, 27th.

**Gales,** 35 miles or more per hour: 43m., 11th, S.S.W.; 44m, 25th, W.N.W.

# DAILY SUMMARY.

| Day. | Barometer Reduced to Sea Level. |  |  | Temperature. Ground Shelter. |  |  |  |  |  |  | No. Hours of Bright Sunshine |
|---|---|---|---|---|---|---|---|---|---|---|---|
|  | Maximum | Minimum. | Mean. Semi-daily | Maximum | Time. | Minimum. | Time. | Mean of Max. and Min. | Mean Hourly Draper. | Mean Sensible Wet Bulb. |  |
| 1 | 29.82 | 29.70 | 29.778 | 34.0 | 2 P | 20.0 | 12 P | 27.0 | 25.5 | 21.5 | 10.6 |
| 2 | 30.00 | 29.81 | 29.905 | 40.0 | 3:30 P | 18 0 | 3 A | 29.0 | 29.9 | 24.0 | 10.3 |
| 3 | 30.09 | 30.00 | 30.071 | 52.0 | 4 P | 25.0 | 6 A | 38.5 | 40.2 | 35.3 | 11.2 |
| 4 | 30.07 | 30.02 | 30.066 | 55.0 | 2:30 P | 38.0 | 6:30 A | 46.5 | 45.5 | 42.3 | 4.5 |
| 5 | 30.05 | 29.92 | 29.995 | 49.5 | 3 P | 42.0 | 7 A | 45.7 | 45.0 | 42.3 | 2.1 |
| 6 | 30.00 | 29.89 | 29.968 | 64.0 | 4 P | 41.0 | 5 A | 52.5 | 50.0 | 45.5 | 9.7 |
| 7 | 30.01 | 29.82 | 29.987 | 64.0 | 4:30 P | 45.0 | 7 A | 54.5 | 52.5 | 49.3 | 5.8 |
| 8 | 30.20 | 30.01 | 30.153 | 68.0 | 4 P | 39 0 | 6:30 A | 53.5 | 52.0 | 41.5 | 11.1 |
| 9 | 30.36 | 30.12 | 30.302 | 54.5 | 4 P | 42 0 | 7 A | 48.3 | 46.6 | 40.0 | 8.2 |
| 10 | 30.36 | 30.04 | 30.265 | 43.5 | 9 P | 37.0 | 5:30 A | 40.3 | 40 8 | 37.0 | 0.7 |
| 11 | 30.04 | 29.71 | 29.857 | 64.0 | 3 P | 42.0 | 0 A | 53.0 | 54.8 | 55 3 | 2.1 |
| 12 | 30.18 | 29 74 | 30.036 | 58.0 | 1 P | 46.0 | 12 P | 52.0 | 51.6 | 46.5 | 6.0 |
| 13 | 30.18 | 29.90 | 29.960 | 56.5 | 0:30 P | 42.0 | 12 P | 49 3 | 48.5 | 43.5 | 5.3 |
| 14 | 30.08 | 29.96 | 30.022 | 55.0 | 4:30 P | 38.0 | 5 A | 46.5 | 45.5 | 37.7 | 12.5 |
| 15 | 30.17 | 30.04 | 30.121 | 59 0 | 4 P | 28 5 | 6:30 A | 43.7 | 44.0 | 37.7 | 11.1 |
| 16 | 30.29 | 29.91 | 30.206 | 45.0 | 2 A | 36.5 | 10 A | 40.7 | 38.3 | 36.0 | 0.0 |
| 17 | 29.91 | 29.75 | 29.842 | 59 5 | 3:30 P | 36.0 | 5 A | 47.7 | 45.8 | 42.5 | 8.4 |
| 18 | 30.09 | 29.85 | 30.005 | 55.5 | 2 P | 40.5 | 6 A | 48.0 | 47.8 | 42.5 | 9.0 |
| 19 | 30.26 | 30 09 | 30.235 | 61.0 | 4 P | 36.5 | 6 A | 48.7 | 47.8 | 40.5 | 12.9 |
| 20 | 30 25 | 30 02 | 30.121 | 65.0 | 0:30 P | 31.0 | 6:30 A | 48.0 | 50.3 | 44.5 | 12.0 |
| 21 | 30.28 | 30.02 | 30.179 | 61.0 | 4 P | 42.0 | 12 P | 51.5 | 51.0 | 44.3 | 12.3 |
| 22 | 30.37 | 30 19 | 30.282 | 69 5 | 6 P | 33.0 | 6 A | 51.3 | 51.0 | 42.3 | 13.0 |
| 23 | 30.23 | 30.06 | 30.147 | 74.0 | 4:30 P | 35.5 | 6 A | 54.7 | 56.0 | 50.0 | 12.8 |
| 24 | 30.05 | 29.78 | 29.850 | 51.0 | 0 A | 33.0 | 12 P | 42.0 | 43 6 | 40.3 | 0.0 |
| 25 | 29 79 | 29.67 | 29.748 | 33.5 | 4:30 P | 25.0 | 7:30 A | 29.3 | 29.7 | 22.3 | 10.3 |
| 26 | 29.87 | 29.65 | 29.694 | 38.5 | 5 P | 24.5 | 3 A | 31.5 | 32.4 | 29.3 | 7.0 |
| 27 | 30.10 | 29.87 | 30.034 | 65.5 | 5 P | 29.0 | 6 A | 47.3 | 48.1 | 45.0 | 13.1 |
| 28 | 30.15 | 29.90 | 30.070 | 64.0 | 1 P | 34.5 | 6 A | 49.3 | 48.4 | 42.5 | 8.0 |
| 29 | 29.95 | 29.86 | 29.939 | 53.0 | 4 P | 43.0 | 5:30 A | 48 0 | 47.3 | 41.7 | 6.5 |
| 30 | 30 06 | 29.94 | 30.020 | 66.5 | 5-30 P | 39.0 | 6 A | 52.7 | 51.1 | 43.5 | 12.4 |

# DAILY SUMMARY.

| Day. | Humidity. |  |  | Wind. |  |  |  |  | Precipitation. |  |  |  |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
|  | Mean Dew Point. | Mean Force vapor. | Mean Relative Humidit | Prevailing Direction. | Total Movement in Miles. | Maximum Pressure Per Square Ft | Miles per Hour. | Time. | Beginning. | Ending. | Total in Inches. Rain.** | Total in Inches. Snow. |
| 1 | 17 0 | .126 | 78.5 | N.W. | 299 | 3.0 | 24 | 11 P |  |  |  |  |
| 2 | 17.0 | .149 | 63.5 | N.W. | 281 | 3.5 | 26 | 2 A |  |  |  |  |
| 3 | 28.5 | .243 | 66.0 | W. | 139 | 3.0 | 24 | 4 P |  |  |  |  |
| 4 | 38.5 | .293 | 82.0 | S.S.W. | 53 | 0.0 | — | — |  |  |  |  |
| 5 | 40.0 | .284 | 88.5 | N.E. | 50 | 0.0 | — | — | 4 A | 6 P | .10 |  |
| 6 | 42.5 | .342 | 81.5 | W S.W. | 143 | 1.0 | 14 | 12 P |  |  |  |  |
| 7 | 48.0 | .378 | 88 5 | S. | 98 | 1.0 | 14 | 11 P | 3 A | 8 A | .07 |  |
| 8 | 30 5 | .358 | 50.5 | N.N.E | 173 | 1.5 | 17 | 9 A | 11 P | 12 P | 05 |  |
| 9 | 34.0 | .291 | 69.5 | S. | 124 | 0.0 | — | — | 0 A | 5 A | .10 |  |
| 10 | 32.0 | .255 | 72.0 | S. | 173 | 2.0 | 20 | 1 P | 10 A | 12 P | .14 |  |
| 11 | 54 0 | .456 | 94.0 | S.S.W. | 362 | 9.0 | 43 | 5 P | 0 A | 12 P | .36 |  |
| 12 | 43.5 | .353 | 80.0 | N.W. | 140 | 1.0 | 14 | 12 M | 0 A | 8 A | .06 |  |
| 13 | 37.0 | .345 | 64.5 | N.W. | 116 | 2.0 | 20 | 7 P |  |  |  |  |
| 14 | 27.5 | .290 | 52 5 | N.N.W. | 205 | 2.0 | 20 | 4 P |  |  |  |  |
| 15 | 31.0 | .270 | 65 5 | N.N.W. | 61 | 1.5 | 17 | 7 P |  |  |  |  |
| 16 | 33.5 | .223 | 86.5 | E. | 151 | 1.0 | 14 | 11 A | 2 A | 12 P | 1.29 |  |
| 17 | 39.0 | .311 | 79.0 | N. | 135 | 0.5 | 10 | 4 A |  |  |  |  |
| 18 | 35.5 | .338 | 63 0 | W.N.W. | 138 | 2.0 | 20 | 6 P |  |  |  |  |
| 19 | 31.5 | .330 | 56.0 | N.N.W. | 201 | 2.0 | 20 | 11 A |  |  |  |  |
| 20 | 37.0 | .367 | 62.5 | SS.W. | 209 | 5.5 | 33 | 2 P |  |  |  |  |
| 21 | 36.0 | .372 | 58.0 | N. | 302 | 3.5 | 26 | 7 A |  |  |  |  |
| 22 | 30.5 | .375 | 49 0 | N. | 175 | 0.5 | 10 | 11 A |  |  |  |  |
| 23 | 42.0 | .478 | 58.0 | W.N.W. | 91 | 2.0 | 20 | 10 P |  |  |  |  |
| 24 | 34.5 | .284 | 73.5 | W. | 125 | 3.0 | 24 | 11 P | 9:30A | 8 P | .15 |  |
| 25 | 9.5 | .146 | 48.0 | W.N.W. | 468 | 9.5 | 44 | 3 P | 12 M | 12 P |  | T |
| 26 | 20.5 | .184 | 62.5 | W. | 307 | 4.0 | 28 | 10 A |  |  |  |  |
| 27 | 38.5 | .370 | 66.0 | N.W. | 71 | 1.0 | 14 | 12 M |  |  |  |  |
| 28 | 36.0 | .323 | 68.0 | W. | 166 | 5.0 | 32 | 4 P | 3 P | 6 P | .05 |  |
| 29 | 34.5 | .325 | 62.0 | N.W. | 228 | 2.5 | 22 | 5 P | 4 P | 5 P | T |  |
| 30 | 35 5 | .358 | 58.0 | N. | 190 | 2.0 | 20 | 9 A |  |  |  |  |

**Rain or melted snow at base of tower. *Included in following day.

## REMARKS

The seasonal progress, which was considerably ahead of the normal when the month began, has not been maintained during the month, and at its close conditions were nearly normal. The cold period near the end of the month checked early growth and did some damage to fruit buds in this vicinity. The high wind and low humidity which accompanied the low temperature materially benefited conditions.

The precipitation during the last part of the month was very light.

The records of the various weather elements compared with their normals show the following features of interest: The mean barometer was slightly above the normal and the range about two-thirds the usual amount. Notwithstanding the small range of pressure the total wind movement was practically normal. The interval between the high and low barometers of the month was less than four days. During the last half of the month the wind was from the northwest quadrant most of the time.

The mean temperature was slightly lower than the normal and the range less than usual. The maximum temperature wus about five degrees lower than usual. The minimum temperature came early in the month, and was more than three degrees lower than the normal for this feature.

The mean dewpoint and relative humidity were both nearly normal.

The total precipitation was about four-fifths of the normal, and more than one-half of it occurred during a single storm. A trace of snow was noted on the 25th, and high ground visible from this station was white with snow.

The amount of bright sunshine was considerably more than usual, and the number of cloudy days small.

J. E. OSTRANDER, Meteorologist.

A. L. CHANDLER, Observer.

BULLETIN No. 365. MAY, 1919

# Meteorological Observations
AT THE
# MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.
*Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.*
*Height of Wind Instruments 72 ft. Time used, 75th Mer.*

## MONTHLY SUMMARY.

**Pressure.** In inches.

| | |
|---|---|
| Maximum reduced to freezing | 30.14, 6th, 8 A |
| Minimum reduced to freezing | 29.45, 18th, 9 A |
| Reduced maximum reading | 30.44, 6th, 8 A |
| Reduced minimum reading | 29.74, 18th, 9 A |
| Mean semi-daily reduced | 29.980 |
| Monthly range | 0.70 |

***Air Temperature.** In Degrees Fahr.

| | |
|---|---|
| Highest | 89.0, 29th, 3 P |
| Lowest | 33.0, 1st, 6 A |
| Mean hourly | 57.6 |
| Mean of means of max. and min. | 57.4 |
| Mean sensible (wet bulb) | 51.7 |
| Monthly range | 56.0 |
| Highest mean daily | 69.4, 29th |
| Lowest mean daily | 43.3, 11th |
| Mean maximum | 69.4 |
| Mean minimum | 45.5 |
| Mean daily range | 23.9 |
| Greatest daily range | 41.0, 29th |
| Least daily range | 5.5, 22d |

**Humidity.**

| | |
|---|---|
| Mean dew point | 47.0 |
| Mean force of vapor | .480 |
| Mean relative humidity | 70.8 |

**Precipitation.** In inches.

| | |
|---|---|
| Total precipitation, in inches | 6.20 |
| Total snow, in inches | Trace |
| Number of days on which .01 inch or more rain fell | 16 |

*Temperature in ground shelter.

**Reduced to freezing and sea-level.

**Wind.**

| | |
|---|---|
| Total movement | 4290 m |
| Greatest daily movement | 244m, 5th |
| Least daily movement | 84m, 7th |
| Mean daily movement | 138m |
| Mean hourly velocity | 5.8 m |

Maximum pressure per square foot, 5.5 lbs 33m per hour, 5th, 12M, W.N.W.
Maximum velocity for 5 minutes, 27m per hour, 5th, 12M, W.N.W.
Prevailing direction, Northwest.

Summary.

| | |
|---|---|
| North | 23 per cent |
| North Northeast | 16 " " |
| South Southwest | 10 " " |
| West Southwest | 10 " " |
| West | 10 " " |
| Other directions | 31 " " |

**Weather.**

| | |
|---|---|
| Mean cloudiness observed | 50 per cent |
| Total cloudiness recorded by the Sun Thermometer | 171 hours = 38 per cent. |
| Number of clear days | 15 |
| Number of fair days | 9 |
| Number of cloudy days | 7 |

**Bright Sunshine.**

Number hours recorded, 282 hrs, = 62 per cent.

**Rain.** 1st, 2d, 4th, 5th, 7th, 9th, 10th, 11th, 12th 15th, 17th, 21st, 22d, 24th, 25th, 26th.

**Frost.** 1st.

**Thunder and Lightning.** 4th.

**Gales.** 35 miles or more per hour: None.

# DAILY SUMMARY.

| Day. | Barometer Reduced to Sea Level. | | | Temperature. Ground Shelter. | | | | | | | No. Hours of Bright Sunshine |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Maximum | Minimum. | Mean. Semi-daily | Maximum | Time. | Minimum. | Time. | Mean of Max. and Min. | Mean Hourly Draper. | Mean Sensible Wet Bulb. | |
| 1 | 30.12 | 29.91 | 30 053 | 57.0 | 2 P | 33.0 | 6 A | 45.0 | 47.6 | 44.7 | 8.3 |
| 2 | 29 96 | 29.81 | 29.883 | 68.5 | 3:30 P | 43.5 | 2 A | 56.0 | 54.3 | 48.0 | 8.0 |
| 3 | 30.15 | 29.95 | 30 079 | 69.0 | 4 P | 43.0 | 1:30 A | 56.0 | 56.7 | 48.0 | 13.3 |
| 4 | 30 15 | 29.96 | 29.998 | 79.5 | 2 P | 45.0 | 6 A | 62.3 | 60.2 | 53.7 | 8.7 |
| 5 | 30.29 | 29.88 | 30.043 | 78.5 | 11 A | 46.5 | 12 P | 62.5 | 62.8 | 55.5 | 10.2 |
| 6 | 30.44 | 30.29 | 30.416 | 70.0 | 4 P | 37.5 | 5 A | 53.7 | 52.7 | 44.5 | 13.4 |
| 7 | 30.34 | 29.89 | 30.067 | 56.5 | 6 P | 41.0 | 5 A | 48.7 | 48.7 | 45.3 | 1:2 |
| 8 | 30.17 | 29.89 | 30.073 | 70.0 | 3:30 P | 50.0 | 5 A | 60.0 | 59.1 | 48.0 | 12.4 |
| 9 | 30.34 | 30.16 | 30.311 | 56.5 | 6 P | 49.0 | 7 A | 52.7 | 52.7 | 47.7 | 7.5 |
| 10 | 30 39 | 30.25 | 30.361 | 51.5 | 1 A | 36.5 | 9:30 P | 44.0 | 45.5 | 40.0 | 0.0 |
| 11 | 30 25 | 30 02 | 30.066 | 47.0 | 4 P | 38 0 | 0 A | 42.5 | 43.3 | 40.7 | 0.0 |
| 12 | 30.02 | 29.98 | 29.992 | 51.0 | 6 P | 41.5 | 5 A | 46.3 | 46.7 | 46.3 | 1.1 |
| 13 | 30.06 | 29 95 | 30.001 | 77.5 | 5:30 P | 42 0 | 6 A | 59.7 | 59.9 | 53 3 | 13.7 |
| 14 | 30 00 | 29.76 | 29.824 | 80.0 | 4 P | 42.5 | 6 A | 61.3 | 63 4 | 58.5 | 12.7 |
| 15 | 30.01 | 29 84 | 29 952 | 60.5 | 12 M | 44.0 | 6 A | 52.3 | 53.2 | 44 5 | 9.7 |
| 16 | 30.06 | 29.95 | 29.988 | 70.0 | 4 P | 38.0 | 6 A | 54 0 | 54.6 | 46 3 | 13.0 |
| 17 | 30.07 | 29.82 | 29.909 | 66.5 | 3 P | 46.0 | 6 A | 56.3 | 53.4 | 49.7 | 1.7 |
| 18 | 29.90 | 29 74 | 29 810 | 63.5 | 5 P | 45.5 | 12 P | 54.5 | 56 0 | 50.3 | 11.6 |
| 19 | 29.05 | 29.90 | 29.925 | 72.5 | 4 30 P | 36.0 | 6 A | 54.3 | 57.0 | 52 3 | 13.5 |
| 20 | 29.96 | 29.85 | 29.905 | 76.5 | 3 P | 43.0 | 6 A | 59.3 | 61 4 | 52.0 | 12.4 |
| 21 | 29.91 | 29 85 | 29.887 | 63.5 | 2:30 P | 56.5 | 12 P | 60.0 | 60.5 | 58.0 | 2.1 |
| 22 | 29.91 | 29.76 | 29 824 | 60.0 | 6 P | 54 5 | 6 A | 57 3 | 57.7 | 56.3 | 3.0 |
| 23 | 29.89 | 29.79 | 29.862 | 74.5 | 3 P | 55 0 | 6 A | 64.7 | 63.6 | 57.7 | 11.0 |
| 24 | 29.95 | 29 88 | 29.924 | 73.0 | 2 P | 50.0 | 5:30 A | 61.5 | 61.0 | 56.5 | 8.5 |
| 25 | 29.88 | 29 77 | 29 799 | 72.5 | 4 P | 54 0 | 3 A | 63.3 | 59.3 | 56 5 | 7 0 |
| 26 | 29.83 | 29 79 | 29.816 | 77.5 | 5 P | 51.0 | 4:30 A | 64.3 | 64.9 | 57.5 | 12.8 |
| 27 | 30.05 | 29 83 | 29.912 | 79.0 | 5 P | 54.0 | 5:30 A | 66.5 | 65.5 | 59.5 | 13.5 |
| 28 | 30.08 | 30.00 | 30 037 | 78.0 | 5-30 P | 44.5 | 6 A | 61.3 | 62.0 | 55.5 | 13.2 |
| 29 | 30.02 | 29.76 | 29.859 | 89.0 | 3 P | 48.0 | 6 A | 68 5 | 69.4 | 58.7 | 12.2 |
| 30 | 29.94 | 29.84 | 29.883 | 81 0 | 4 P | 53.5 | 6 A | 67.3 | 69 0 | 58.3 | 13.5 |
| 31 | 29.95 | 29.87 | 29.920 | 82.0 | 4 P | 47.0 | 6 A | 64.5 | 65 4 | 58.3 | 12.5 |

# DAILY SUMMARY.

| Day. | Humidity. | | | Wind. | | | | | Precipitation. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Mean Dew Point. | Mean Force vapor. | Mean Relative Humidit | Prevailing Direction. | Total Movement in Miles. | Maximum Pressure Per Square Ft | Miles per Hour. | Time. | Beginning. | Ending. | Total in Inches. Rain.** | Total in Inches. Snow. |
| 1 | 41.0 | .328 | 77.0 | W. | 103 | 1.5 | 17 | 3 P | 7 P | 12 P | .16 | |
| 2 | 43.5 | .391 | 74.0 | W. | 121 | 3.5 | 26 | 2 P | 0 A | 2 A | .15 | |
| 3 | 39.5 | .448 | 52.5 | W.N.W. | 233 | 3.5 | 26 | 1 P | | | | |
| 4 | 50.5 | .496 | 79.0 | W S.W. | 116 | 2.5 | 22 | 7 P | 2 A | 12 P | 67 | |
| 5 | 51.0 | .553 | 68.0 | N.W. | 244 | 5.5 | 33 | 12 M | 3:30 P | 4:30 P | .01 | |
| 6 | 34.5 | .391 | 53.0 | W. | 137 | 1.0 | 14 | 8 P | | | | |
| 7 | 40.0 | .379 | 66.0 | S.S.W. | 84 | 0.5 | 10 | 6 P | 9:30 A | 3 P | .02 | |
| 8 | 37.5 | .479 | 47.0 | N.N.W. | 184 | 1.5 | 17 | 10 A | | | | |
| 9 | 43.0 | .391 | 71.5 | N.N E | 95 | 0.0 | — | — | 4:30 A | 3 P | .04 | |
| 10 | 35.0 | .293 | 72.0 | E.N.E. | 151 | 1.5 | 17 | 2 P | 10 A | 12 P | .53 | |
| 11 | 36.5 | .284 | 77.5 | N. | 231 | 1.5 | 17 | 3 P | 0 A | 12 P | .04 | |
| 12 | 45.0 | .323 | 93.0 | N. | 151 | 0.5 | 10 | 2 A | 0 A | 12 P | .35 | |
| 13 | 44.5 | .487 | 61.0 | N. | 130 | 2.0 | 20 | 12 M | | | | |
| 14 | 54.5 | .594 | 72.5 | S. | 114 | 1.0 | 14 | 3 P | | | | |
| 15 | 43.5 | .395 | 74.5 | N.N.E. | 130 | 1.0 | 14 | 4 A | 1 A | 12 P | .05 | |
| 16 | 43.0 | .425 | 66.5 | S S.E. | 112 | 2.0 | 20 | 8 P | | | | |
| 17 | 48.0 | .392 | 96.5 | SS.W. | 113 | 4.5 | 30 | 1 P | 2:30 A | 11 P | .98 | |
| 18 | 44.0 | 451 | 56.5 | W.N.W. | 194 | 3.5 | 26 | 12 M | | | | |
| 19 | 45.5 | .511 | 61.0 | S.W. | 112 | 1.5 | 17 | 12 M | | | | |
| 20 | 44.0 | .529 | 56.0 | S. | 124 | 2.0 | 20 | 3 P | | | | |
| 21 | 56.5 | .513 | 90.5 | E.N.E. | 91 | 0.5 | 10 | 6 A | 7 A | 12 P | 2.37 | |
| 22 | 55.5 | 456 | 95.5 | N. | 88 | 0.0 | — | — | 0 A | 12 P | .70 | |
| 23 | 56.0 | .526 | 86.0 | S.S.W. | 187 | 4.0 | 28 | 7 P | | | | |
| 24 | 54.0 | .514 | 81.0 | W.S.W. | 125 | 1.5 | 17 | 1 P | 3 P | 12 P | .08 | |
| 25 | 55.0 | .506 | 85.0 | N N.E. | 89 | 3.5 | 26 | 5 P | 4 P | 5 P | .02 | |
| 26 | 52.0 | .617 | 63.0 | N. | 187 | 2.5 | 22 | 11 A | 11 P | 12 P | .03 | |
| 27 | 56.0 | .620 | 71.0 | N. | 128 | 2.0 | 20 | 1 P | | | | |
| 28 | 50.5 | .558 | 66.5 | N. | 102 | 1.0 | 14 | 11 A | | | | |
| 29 | 52.0 | .720 | 59.0 | N.W. | 99 | 2.0 | 20 | 2 P | | | | |
| 30 | 52.0 | .697 | 54.0 | N.N.E. | 189 | 3.5 | 26 | 1 P | | | | |
| 31 | 53.5 | .614 | 67.5 | N.N.E. | 126 | 1.0 | 14 | 10 A | | | | |

**Rain or melted snow at base of tower. *Included in following day.

## REMARKS

The weather during the month was disappointing as a whole, although in many respects conditions were nearly normal. A cool period at the end of the first decade and an excessive rainstorm at the end of the second decade materially modified the character of the month from that shown by the means for the month. While rain was noted on more than one-half the days, the sunshine record was large. Planting was retarded by excessive moisture in many places and the seasonal progress was slow.

The records of the several weather elements, compared with the normals, show the following features: The barometer was rather steady and the range of pressure was comparatively small. The mean pressure was practically normal. The total wind movement was less than the normal and not a single gale was recorded on the pressure chart. Wind from the North to West points of the compass predominated.

The mean temperature was practically normal, and the maximum and minimum were both about two degrees above their respective normals. The minimum was registered on the first morning of the month, and the only frost noted occurred at that time. The maximum occurred near the end of the month and the greatest daily range was noted at that time.

The mean dew point and relative humidity were practically normal.

The total precipitation was about seventy per cent more than the normal and nearly one-half of it fell in a single storm.

The percentage of sunshine was the same as for the preceding month, and about one-half the days were clear.

J. E. OSTRANDER, Meteorologist.

A. L. CHANDLER, Observer.

BULLETIN No. 366. JUNE, 1919

# Meteorological Observations
AT THE
# MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.
*Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.*
*Height of Wind Instruments 72 ft. Time used, 75th Mer.*

## MONTHLY SUMMARY.

### Pressure. In inches.

| | |
|---|---|
| Maximum reduced to freezing | 30.22, 12th, 8 A |
| Minimum reduced to freezing | 29.50, 27th, 2 P |
| Reduced maximum reading | 30.51, 12th, 8 A |
| Reduced minimum reading | 29.78, 27th, 2 P |
| Mean semi-daily reduced | 30.127 |
| Monthly range | 0.73 |

### *Air Temperature. In Degrees Fahr.

| | |
|---|---|
| Highest | 101.0, 3d, 4 P |
| Lowest | 41.5, 23d, 4 A |
| Mean hourly | 68.4 |
| Mean of means of max. and min. | 68.3 |
| Mean sensible (wet bulb) | 61.8 |
| Monthly range | 59.5 |
| Highest mean daily | 78.9, 3d, 4th |
| Lowest mean daily | 52.8, 9th |
| Mean maximum | 81.8 |
| Mean minimum | 55.2 |
| Mean daily range | 26.2 |
| Greatest daily range | 43.5, 13th |
| Least daily range | 5.5, 8th |

### Humidity.

| | |
|---|---|
| Mean dew point | 58.0 |
| Mean force of vapor | .683 |
| Mean relative humidity | 73.9 |

### Precipitation. In inches.

| | |
|---|---|
| Total precipitation, in inches | 1.09 |
| Total snow, in inches | |
| Number of days on which .01 inch or more rain fell | 6 |

*Temperature in ground shelter.
**Reduced to freezing and sea-level.

### Wind.

| | |
|---|---|
| Total movement | 3456 m |
| Greatest daily movement | 264m, 28th |
| Least daily movement | 36m, 10th |
| Mean daily movement | 115m |
| Mean hourly velocity | 4.8 m |
| Maximum pressure per square foot, 4.5 lbs 30m per hour, 26th, 3P, S.S.W. | |
| Maximum velocity for 5 minutes, 18m per hour, 26th, 3P, S.S.W. | |
| Prevailing direction, South. | |

Summary.

| | |
|---|---|
| South | 20 per cent |
| South Southwest | 20 " " |
| Southwest | 10 " " |
| South Southeast | 10 " " |
| Other directions | 40 " " |

### Weather.

| | |
|---|---|
| Mean cloudiness observed | 43 per cent |
| Total cloudiness recorded by the Sun Thermometer | 131 hours = 29 per cent. |
| Number of clear days | 14 |
| Number of fair days | 12 |
| Number of cloudy days | 4 |

### Bright Sunshine.

Number hours recorded, 326 hrs. = 71 per cent.

**Rain,** 6th, 8th, 9th, 15th, 20th, 26th, 27th.

**Gales,** 35 miles or more per hour: None.

# DAILY SUMMARY.

| Day. | Barometer Reduced to Sea Level. | | | Temperature. Ground Shelter. | | | | | | | No. Hours of Bright Sunshine |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | **Maximum** | Minimum. | Mean. Semi-daily | Maximum | Time. | Minimum. | Time. | Mean of Max. and Min. | Mean Hourly Draper. | Mean Sensible Wet Bulb. | |
| 1 | 30.05 | 29.96 | 30.003 | 76.5 | 4 P | 48.0 | 5:30 A | 62.3 | 62.8 | 55 0 | 12.1 |
| 2 | 30.06 | 29.98 | 30.013 | 89.0 | 5 P | 50 5 | 5:30 A | 69.7 | 69.3 | 61.0 | 13.1 |
| 3 | 30.17 | 30 06 | 30.112 | 101.0 | 4 P | 60.5 | 6 A | 80.7 | 78.9 | 73.7 | 12.8 |
| 4 | 30.18 | 30.10 | 30.145 | 96.5 | 1 P | 64.0 | 5:30 A | 80.3 | 78.9 | 72.7 | 11.3 |
| 5 | 30.16 | 30.05 | 30.105 | 90.5 | 2 P | 65.0 | 5 A | 77.7 | 77.5 | 69.3 | 11.0 |
| 6 | 30.12 | 30 00 | 30.071 | 80.0 | 12 M | 63 5 | 3 A | 71.7 | 70.3 | 65.7 | 10.5 |
| 7 | 30.26 | 29.99 | 30.103 | 87.5 | 5:30 P | 56 5 | 12 P | 72.0 | 71.1 | 62 0 | 11.7 |
| 8 | 30.41 | 30.25 | 30.368 | 58.0 | 2 P | 52.5 | 12 P | 55.3 | 55.3 | 51.0 | 2.5 |
| 9 | 30.37 | 30.30 | 30.341 | 57.5 | 5 P | 51.0 | 7 A | 54.3 | 52.8 | 50.0 | 0.7 |
| 10 | 30 32 | 30.25 | 30.308 | 81.0 | 6 P | 50 0 | 3 A | 65.5 | 63.2 | 59.0 | 11.8 |
| 11 | 20.45 | 30.33 | 30.393 | 82.0 | 2 P | 55.0 | 5 A | 68 5 | 68.7 | 63.7 | 12.2 |
| 12 | 30.51 | 30.40 | 30.460 | 83 0 | 4 P | 52 0 | 12 P | 67.5 | 66 7 | 53 3 | 14.0 |
| 13 | 30'42 | 30.25 | 30.327 | 87.5 | 3:30 P | 44.0 | 4 A | 65.7 | 67.3 | 60.5 | 13.4 |
| 14 | 30.25 | 30 04 | 30.128 | 85.0 | 2 P | 54 0 | 5:30 A | 69.5 | 69.2 | 62.0 | 13.2 |
| 15 | 30.07 | 29.99 | 30 028 | 74.5 | 5-30 P | 60.0 | 5 A | 67.3 | 67 8 | 64.3 | 8.3 |
| 16 | 30.05 | 29.92 | 29.993 | 89.0 | 4 30 P | 56.0 | 5:30 A | 72.5 | 72.7 | 67.5 | 13.4 |
| 17 | 30 09 | 29.96 | 30.009 | 81.5 | 5 P | 64.0 | 6 A | 72.7 | 71 7 | 67.5 | 10.0 |
| 18 | 30.24 | 30.09 | 30.186 | 84.5 | 3:30 P | 61.0 | 5:30 A | 72 7 | 70.6 | 64 3 | 11.5 |
| 19 | 30.24 | 30 03 | 30.126 | 87.0 | 3 P | 60.5 | 6 A | 73.7 | 71.3 | 64.3 | 11.7 |
| 20 | 30.03 | 29.95 | 29 966 | 80.0 | 2 P | 61.0 | 4 A | 70.5 | 69 0 | 65.5 | 8.0 |
| 21 | 30.02 | 29 86 | 29.931 | 85.0 | 3:30 P | 57.0 | 6 A | 71.0 | 71.0 | 62.0 | 14.0 |
| 22 | 30.13 | 30 02 | 30.089 | 68.0 | 3 P | 47.5 | 12 P | 57.7 | 61.0 | 52 3 | 13.7 |
| 23 | 30.11 | 29.81 | 29.963 | 79.0 | 5 P | 41.5 | 4 A | 60.3 | 59.9 | 53.7 | 11.3 |
| 24 | 30 07 | 29.94 | 29.977 | 94.0 | 4 P | 57 0 | 5 A | 75.5 | 76.2 | 69.0 | 13.3 |
| 25 | 30.16 | 30.07 | 30 149 | 86 0 | 1 P | 60.0 | 6 A | 73.0 | 72 9 | 66.3 | 11.0 |
| 26 | 30.16 | 29.92 | 30 036 | 78.5 | 3:30 P | 63.0 | 3 A | 70.7 | 70.5 | 69.3 | 4.5 |
| 27 | 29.96 | 29 78 | 29.985 | 72.5 | 2:30 P | 59.0 | 12 P | 65.7 | 67.8 | 64.3 | 3 8 |
| 28 | 30.20 | 29 96 | 30.063 | 71.5 | 5 P | 51.0 | 5:30 A | 61.3 | 60.5 | 51.7 | 13.8 |
| 29 | 30.35 | 30 20 | 30.288 | 74.0 | 4 P | 43.5 | 5 A | 58.7 | 60.1 | 51.5 | 13.7 |
| 30 | 30.38 | 30.20 | 30.283 | 84.0 | 3:30 P | 48.5 | 5 A | 66 3 | 67.0 | 60.7 | 13.9 |

# DAILY SUMMARY.

| Day. | Humidity. | | | Wind. | | | | | | Precipitation. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Mean Dew Point. | Mean Force vapor. | Mean Relative Humidit | Prevailing Direction. | Total Movement in Miles. | Maximum Pressure Per Square Ft | Miles per Hour. | Time. | | Beginning. | Ending. | Total in Inches. | |
| | | | | | | | | | | | | Rain.** | Snow. |
| 1 | 48 0 | .582 | 58.0 | W.S.W. | 58 | 0.5 | 10 | 7 P | | | | | |
| 2 | 55 5 | .709 | 65.0 | S.S.E. | 48 | 0.0 | — | — | | | | | |
| 3 | 70.0 | .940 | 79.5 | S.W. | 48 | 0.0 | — | — | | | | | |
| 4 | 70 5 | .952 | 78.5 | S.S.W. | 51 | 0.5 | 10 | 5 P | | | | | |
| 5 | 65.5 | .869 | 74.5 | S. | 142 | 2.5 | 22 | 5 P | | | | | |
| 6 | 63.5 | .715 | 83.5 | S. | 210 | 2.5 | 22 | 1 P | | 3 P | 11 P | .01 | |
| 7 | 58.5 | .667 | 76.0 | S.W. | 114 | 2 0 | 20 | 5 P | | | | | |
| 8 | 48 0 | .423 | 79.0 | E.N.E. | 121 | 0.5 | 10 | 6 A | | 9 A | 12 P | .01 | |
| 9 | 48.0 | .392 | 86.0 | E. | 54 | 0.0 | — | — | | 0 A | 11 P | 24 | |
| 10 | 57.5 | .571 | 82.0 | N.W. | 36 | 0.0 | — | — | | | | | |
| 11 | 61.5 | .691 | 78.5 | E.N.E | 61 | 0.0 | — | — | | | | | |
| 12 | 43.5 | .581 | 51.5 | S S.E. | 99 | 0.5 | 10 | 11 A | | | | | |
| 13 | 55.5 | .688 | 64.5 | S.S.E. | 56 | 0.0 | — | — | | | | | |
| 14 | 58.0 | .707 | 68.0 | S.S.W. | 98 | 1.0 | 14 | 6 P | | | * | | |
| 15 | 61.5 | .708 | 77.5 | S. | 81 | 0.0 | — | — | | 10 A | 11:30 A | T | |
| 16 | 65.0 | .817 | 75 0 | S. | 88 | 0.5 | 10 | 2 P | | | | | |
| 17 | 65.0 | .780 | 81.5 | S.E. | 75 | 0.0 | — | — | | | | | |
| 18 | 62.0 | .718 | 76.5 | S. | 87 | 0.5 | 10 | 3 P | | | | | |
| 19 | 62.0 | .685 | 81.0 | S.S.W. | 163 | 3.0 | 24 | 2 P | | | | | |
| 20 | 63.5 | .726 | 80.0 | E. | 121 | 0.5 | 10 | 2 P | | 10 A | 5 P | .02 | |
| 21 | 56.0 | .698 | 82.5 | N.N.W. | 164 | 3.5 | 26 | 5 P | | | | | |
| 22 | 43.5 | .556 | 52.0 | N.N.W. | 263 | 3.0 | 24 | 2 P | | | | | |
| 23 | 49.5 | .540 | 68.5 | S. | 69 | 1.5 | 17 | 2 P | | | | | |
| 24 | 65.0 | .926 | 67.0 | S.W. | 80 | 0.5 | 10 | 2 P | | | | | |
| 25 | 62.5 | .817 | 70.0 | S S.W. | 125 | 2.0 | 20 | 3 P | | | | | |
| 26 | 68.5 | .764 | 89.5 | S.S.W. | 243 | 4.5 | 30 | 3 P | | 10 A | 12 P | .07 | |
| 27 | 63.5 | .650 | 91 5 | W. | 252 | 2.5 | 22 | 1 A | | 0 A | 6 P | .74 | |
| 28 | 46.0 | .487 | 64.0 | N.N.E. | 264 | 2.5 | 22 | 12 M | | | | | |
| 29 | 44.5 | .494 | 59 0 | E.S.E. | 114 | 0.5 | 10 | 9 A | | | | | |
| 30 | 57.5 | .631 | 76.0 | S.S.W. | 71 | 0.0 | — | — | | | | | |

**Rain or melted snow at base of tower.

* Included in following day.

## REMARKS

The weather during June presented a marked contrast with that of the preceding month. The precipitation was unusually small and the only rainfall of any amount occurred near the end of the month. For more than a month from the 22d of May the precipitation was practically negligible as far as its effect on growing crops was concerned. A moderate storm on June 26th—27th furnished some relief, but rain was greatly needed when the month closed.

The early part of the month was marked by a period of high temperature—in fact, the first seven days were the hottest part of the month. The month as a whole was considerably warmer than usual.

The records of the several weather elements show the following features of interest: The mean barometer was exceptionally high for the time of year. Only six days show a mean pressure below 30 inches. The range of pressure was practically normal, and the maximum and minimum were both considerably above the normal. The total wind movement was slightly less than the normal, and no gales were registered. Most of the wind was from the southwest quadrant.

The mean temperature was about two and one-half degrees higher than usual, and the maximum reading was over 100 degrees for the first time in June at this station. The minimum temperature was about a degree above the normal. While a few cool nights were noted there was no approach to frost at this station.

The mean dew point and relative humidity were both slightly higher than their normal values.

The precipitation was about one-third of the normal amount and nearly all of it occurred in a single storm.

The amount of sunshine was much greater than usual and only four days were classed as cloudy.

J. E. OSTRANDER, Meteorologist.

G. A. SMITH, Observer.

BULLETIN No. 367. JULY, 1919

# Meteorological Observations
AT THE
# MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.
*Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.*
*Height of Wind Instruments 72 ft. Time used, 75th Mer.*

## MONTHLY SUMMARY.

**Pressure.** In inches.

| | |
|---|---|
| Maximum reduced to freezing | 30.07, 9th, 4 A |
| Minimum reduced to freezing | 29.30, 11th, 1 A |
| Reduced maximum reading | 30.37, 9th, 4 A |
| Reduced minimum reading | 29.59, 11th, 1 A |
| Mean semi-daily reduced | 29.972 |
| Monthly range | 0.78 |

***Air Temperature.** In Degrees Fahr.

| | |
|---|---|
| Highest | 98.0, 4th, 1:30 P |
| Lowest | 49.0, 12th, 5 A |
| Mean hourly | 71.8 |
| Mean of means of max. and min. | 71.8 |
| Mean sensible (wet bulb) | 65.9 |
| Monthly range | 49.0 |
| Highest mean daily | 85.4, 5th |
| Lowest mean daily | 61.0, 11th |
| Mean maximum | 83.4 |
| Mean minimum | 60.2 |
| Mean daily range | 23.2 |
| Greatest daily range | 43.0, 1st |
| Least daily range | 5.5, 22d |

**Humidity.**

| | |
|---|---|
| Mean dew point | 63.5 |
| Mean force of vapor | .772 |
| Mean relative humidity | 77.1 |

**Precipitation.** In inches.

| | |
|---|---|
| Total precipitation, in inches | 4.17 |
| Total snow, in inches | |
| Number of days on which .01 inch or more rain fell | 15 |

*Temperature in ground shelter.
**Reduced to freezing and sea-level.

**Wind.**

| | |
|---|---|
| Total movement | 3719 m |
| Greatest daily movement | 295m, 22d |
| Least daily movement | 35m, 17th |
| Mean daily movement | 120m |
| Mean hourly velocity | 5.0 m |

Maximum pressure per square foot, 4.0 lbs 28m per hour, 9th, 2P, S.

Maximum velocity for 5 minutes, 21m per hour, 28th, 1P, S.

Prevailing direction, South Southwest.

Summary.

| | |
|---|---|
| South | 45 per cent |
| South Southwest | 10 " " |
| Southwest | 13 " " |
| North Northeast | 10 " " |
| North | 10 " " |
| Other directions | 12 " " |

**Weather.**

| | |
|---|---|
| Mean cloudiness observed | 45 per cent |
| Total cloudiness recorded by the Sun Thermometer | 139 hours = 30 per cent. |
| Number of clear days | 15 |
| Number of fair days | 12 |
| Number of cloudy days | 4 |

**Bright Sunshine.**

Number hours recorded, 323 hrs, = 70 per cent.

**Rain**, 5th. 6th, 7th, 10th, 11th, 15th, 16th, 18th, 19th, 21st, 22d, 23d, 24th, 26th, 31st.

**Thunder and Lightning**, 6th. 10th, 11th, 24th, , 26th.

**Gales**, 35 miles or more per hour: None.

# DAILY SUMMARY.

| Day. | Barometer Reduced to Sea Level. | | | Temperature. Ground Shelter. | | | | | | | No. Hours of Bright Sunshine |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Maximum | Minimum. | Mean. Semi-daily | Maximum | Time. | Minimum. | Time. | Mean of Max. and Min. | Mean Hourly Draper. | Mean Sensible Wet Bulb. | |
| 1 | 30.22 | 30.07 | 30.135 | 94.5 | 3:30 P | 51.5 | 6 A | 73.0 | 72.2 | 63.0 | 12.9 |
| 2 | 30.11 | 29.94 | 30 022 | 94.5 | 4 P | 57.5 | 6 A | 76.0 | 74.4 | 64.7 | 13.1 |
| 3 | 29.94 | 29.83 | 29.888 | 96.5 | 3 P | 59.5 | 6 A | 78.0 | 78.3 | 70.7 | 13.8 |
| 4 | 29.91 | 29.80 | 29.860 | 98.0 | 1:30 P | 60.0 | 5:30 A | 79.0 | 80.1 | 72.0 | 13.5 |
| 5 | 29 90 | 29.79 | 29.830 | 97.5 | 4 P | 68.0 | 4:30 A | 82.7 | 85.4 | 80.0 | 11.3 |
| 6 | 29.80 | 29.75 | 29.771 | 84.5 | 1 P | 66.0 | 12 P | 75.3 | 76.0 | 70.0 | 5.5 |
| 7 | 30.13 | 29 80 | 30.033 | 81.0 | 3 P | 59 5 | 6 A | 70.3 | 69.8 | 63.3 | 13.0 |
| 8 | 30.35 | 30.11 | 30.236 | 79.0 | 4 30 P | 54.0 | 5:30 A | 66 5 | 65.6 | 56.5 | 12.4 |
| 9 | 30.37 | 30.06 | 30.205 | 78.0 | 3 P | 50.0 | 5:30 A | 64.0 | 63.9 | 58.3 | 9.5 |
| 10 | 30 06 | 29.61 | 29.738 | 71.0 | 6 P | 58.0 | 6:30 A | 64.5 | 64.9 | 62.7 | 3.5 |
| 11 | 29.87 | 29.59 | 29 732 | 67.0 | 2 P | 53 0 | 12 P | 60.0 | 61.0 | 54.7 | 11.6 |
| 12 | 30.00 | 29.87 | 29.977 | 77.0 | 3:30 P | 49.0 | 5 A | 63 0 | 65 6 | 61.5 | 11.6 |
| 13 | 30 06 | 29.97 | 30.015 | 86.0 | 5 P | 59.0 | 6 A | 72 5 | 72 0 | 62.5 | 12.5 |
| 14 | 30.12 | 30.04 | 30 082 | 88.0 | 3:30 P | 54.5 | 5:30 A | 71.3 | 71.5 | 62.0 | 12.3 |
| 15 | 30.10 | 29.88 | 29.966 | 73.0 | 2 P | 61.5 | 5 A | 67.3 | 65.3 | 60 3 | 4.4 |
| 16 | 30.02 | 29.84 | 29.902 | 81.0 | 2:30 P | 63 5 | 3 A | 72 3 | 70.2 | 68.3 | 6.8 |
| 17 | 30.13 | 30.02 | 30.098 | 82.5 | 2 P | 61.5 | 4 A | 72.0 | 72.5 | 67.5 | 11.3 |
| 18 | 30.22 | 30.11 | 30.160 | 83.5 | 3 P | 67.5 | 6 A | 75.5 | 74.3 | 68.7 | 10.3 |
| 19 | 30.13 | 30.01 | 30.069 | 85.0 | 3-30 P | 69.0 | 3 A | 77.0 | 74 4 | 72.0 | 8.1 |
| 20 | 30.04 | 30 00 | 30 041 | 83 0 | 1 P | 67.0 | 5 A | 75.0 | 74.4 | 71.0 | 11.2 |
| 21 | 30.06 | 30.00 | 30.034 | 82.0 | 2:30 P | 69 5 | 3 A | 75.7 | 75.1 | 73.5 | 6.3 |
| 22 | 30.03 | 29 96 | 30.000 | 77.0 | 2 P | 71.5 | 12 P | 74.3 | 73.5 | 72.5 | 4.1 |
| 23 | 30.00 | 29 89 | 29.956 | 83.0 | 3 P | 67.0 | 12 P | 75 0 | 72.8 | 68.7 | 7.6 |
| 24 | 29.97 | 29.80 | 29 886 | 87.0 | 3 P | 61.0 | 5:30 A | 74.0 | 75.2 | 71.5 | 12.8 |
| 25 | 30.08 | 29.84 | 30.004 | 84.0 | 4 P | 61.0 | 12 P | 72.5 | 72.1 | 61.5 | 13.3 |
| 26 | 30.18 | 30 00 | 30.078 | 76 5 | 4 P | 55.0 | 5 A | 65.7 | 66.1 | 62.3 | 6.8 |
| 27 | 30.00 | 29 84 | 29 920 | 86.0 | 4:30 P | 58 0 | 6 A | 72.0 | 74.1 | 69.7 | 11.8 |
| 28 | 29.84 | 29.74 | 29 779 | 85.0 | 3 P | 70.0 | 12 P | 77.5 | 78.2 | 68.0 | 13.3 |
| 29 | 29 90 | 29 75 | 29.832 | 79.0 | 3 P | 59.0 | 5:30 A | 69.0 | 68 8 | 61.5 | 12.5 |
| 30 | 30.00 | 29.90 | 29.970 | 82.0 | 4 P | 52.0 | 5:30 A | 67.0 | 67.4 | 61.0 | 13.5 |
| 31 | 30.01 | 29.82 | 29.910 | 83.5 | 3 P | 52 0 | 6 A | 67 7 | 70.1 | 63.5 | 12.8 |

# DAILY SUMMARY.

| Day. | Humidity. | | | Wind. | | | | | Precipitation. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Mean Dew Point. | Mean Force vapor. | Mean Relative Humidit | Prevailing Direction. | Total Movement in Miles. | Maximum Pressure Per Square Ft | Miles per Hour. | Time. | Beginning. | Ending. | Total in Inches. Rain.** | Total in Inches. Snow. |
| 1 | 58.5 | .752 | 66.5 | S. | 96 | 0.5 | 10 | 10 A | | | | |
| 2 | 61.0 | .793 | 67.5 | S. | 67 | 0.0 | — | — | | | | |
| 3 | 68.0 | .912 | 75.5 | S.W. | 62 | 1.0 | 14 | 1 P | | | | |
| 4 | 69.0 | .997 | 71.0 | S.W. | 44 | 0.5 | 10 | 3 P | | | | |
| 5 | 76.5 | 1.354 | 67.5 | N.W. | 77 | 2.0 | 20 | 8 P | 10 P | 12 P | .04 | |
| 6 | 78.5 | .845 | 83.0 | N.N.E. | 83 | 0.0 | — | — | 0 A | 8 P | 64 | |
| 7 | 59.5 | .711 | 72.0 | N.N.E. | 110 | 0.5 | 10 | 9 A | 0 A | 4 A | .10 | |
| 8 | 51.0 | .589 | 63.0 | N. | 161 | 2.0 | 20 | 11 A | | | | |
| 9 | 54.5 | .580 | 73.0 | S. | 185 | 4.0 | 28 | 2 P | | | | |
| 10 | 61.5 | .608 | 91.0 | S.S.W. | 229 | 2.5 | 22 | 8 P | 1 A | 3 P | .51 | |
| 11 | 50.0 | .524 | 68.0 | W. | 190 | 3.5 | 26 | 4 P | 9 P | 12 P | .21 | |
| 12 | 57.5 | .671 | 70.5 | S.W. | 107 | 0.5 | 10 | 2 P | | | | |
| 13 | 57.5 | .742 | 64.0 | N.N.E. | 63 | 0.0 | — | — | | | | |
| 14 | 57.0 | .741 | 64.0 | S. | 48 | 0.5 | 10 | 7 P | | | | |
| 15 | 58.0 | .592 | 83.0 | S. | 178 | 2.5 | 22 | 5 P | 9 A | 12 M | .10 | |
| 16 | 68.0 | .737 | 91.5 | S. | 94 | 1.0 | 14 | 1 A | 2 A | 8 A | .38 | |
| 17 | 65.5 | .771 | 81.5 | S.W. | 35 | 0.0 | — | — | | | | |
| 18 | 67.5 | .788 | 84.5 | S. | 106 | 2.5 | 22 | 8 P | 11 P | 12 P | .02 | |
| 19 | 71.5 | .837 | 91.5 | S. | 93 | 0.5 | 10 | 3 P | 0 A | 9 A | .93 | |
| 20 | 70.0 | .827 | 88.5 | S. | 92 | 1.0 | 14 | 5 P | | | | |
| 21 | 72.5 | .863 | 92.5 | S. | 160 | 3.5 | 26 | 1 P | 8 A | 12 P | .17 | |
| 22 | 72.0 | .822 | 95.5 | S. | 295 | 3.0 | 24 | 0 A | 0 A | 5 P | .57 | |
| 23 | 68.5 | .744 | 91.5 | S. | 91 | 1.0 | 14 | 1 A | 2 A | 11 A | .29 | |
| 24 | 69.5 | .902 | 82.0 | S. | 99 | 1.0 | 14 | 3 P | 10 P | 11 P | .03 | |
| 25 | 56.5 | .710 | 65.0 | N. | 122 | 1.0 | 14 | 1 P | | | | |
| 26 | 61.0 | .605 | 88.5 | S. | 84 | 2.0 | 20 | 4 P | 1 P | 7 P | .16 | |
| 27 | 67.0 | .891 | 75.0 | S.S.W. | 102 | 1.0 | 14 | 12 M | | | | |
| 28 | 67.5 | .971 | 70.0 | W. | 222 | 3.0 | 24 | 3 P | | | | |
| 29 | 57.5 | .698 | 67.0 | W.N.W. | 211 | 2.5 | 22 | 2 P | | | | |
| 30 | 56.5 | .649 | 72.0 | N. | 103 | 0.0 | — | — | | | | |
| 31 | 60.5 | .716 | 74.0 | S.S.W. | 110 | 1.0 | 14 | 3 P | 11 P | 12 P | .02 | |

**Rain or melted snow at base of tower. * Included in following day.

## REMARKS

The weather during July was nearly normal in most respects, although a general opinion to the contrary was prevalent. The large amount of south wind and the rather frequent rains were the main reasons for misjudging the general character of the month. The total precipitation, especially, was less than generally expected.

A comparison of the records of the several weather elements with their normals shows the following features: The mean barometer was practically normal and the range slightly more than usual. The maximum and minimum pressures show but small departures from their normals. The total wind movement was about a hundred miles more than usual, and the direction was from the south or nearly south a large part of the time. On but four dates was the total movement over two hundred miles, and not a single gale was recorded on the pressure chart.

The mean temperature was about one degree higher than the normal, and the first few days were the hottest part of the month. The maximum and minimum temperatures were both considerably higher than their normal values. The mean hourly temperature was above eighty degrees on but two days, the 4th and 5th.

The mean dew point and relative humidity were both considerably higher than usual, due largely to the south wind.

The total precipitation was nearly normal and the number of storms large, in fact, rain was recorded on about one-half the days of the month.

Notwithstanding the numerous rains the amount of sunshine recorded was abnormally large.

J. E. OSTRANDER, Meteorologist.

G. A. SMITH, Observer.

BULLETIN No. 368. AUGUST, 1919

# Meteorological Observations

AT THE

# MASSACHUSETTS
# AGRICULTURAL EXPERIMENT
# STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.
*Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.*
*Height of Wind Instruments 72 ft. Time used, 75th Mer.*

## MONTHLY SUMMARY.

### Pressure.** In inches.

| | |
|---|---|
| Maximum reduced to freezing, | 29.99, 12th, 8 A |
| Minimum reduced to freezing, | 29.35, 8th, 3 A |
| Reduced maximum reading | 30.28, 12th, 8 A |
| Reduced minimum reading, | 29.64, 8th, 3 A |
| Mean semi-daily reduced | 29.944 |
| Monthly range | 0.64 |

### *Air Temperature. In Degrees Fahr.

| | |
|---|---|
| Highest | 88.0, 24th, 2 P |
| Lowest | 43.0, 10th, 6 A |
| Mean hourly | 65.8 |
| Mean of means of max. and min. | 65.8 |
| Mean sensible (wet bulb) | 60.9 |
| Monthly range | 45.0 |
| Highest mean daily | 73.0, 7th |
| Lowest mean daily | 57.9, 27th |
| Mean maximum | 77.0 |
| Mean minimum | 54.6 |
| Mean daily range | 22.4 |
| Greatest daily range | 36.5, 10th |
| Least daily range | 5.0, 18th |

### Humidity.

| | |
|---|---|
| Mean dew point | 58.3 |
| Mean force of vapor | .632 |
| Mean relative humidity | 77.3 |

### Precipitation. In inches.

| | |
|---|---|
| Total precipitation, in inches | 4.81 |
| Total snow, in inches | |
| Number of days on which .01 inch or more rain fell | 11 |

### Wind.

| | |
|---|---|
| Total movement | 3210 m |
| Greatest daily movement | 235m, 14th |
| Least daily movement | 43m, 10th, 11th |
| Mean daily movement | 104m |
| Mean hourly velocity | 4.3 m |

Maximum pressure per square foot, 3.5 lbs 26m per hour, 31st, 3P, S.

Maximum velocity for 5 minutes, 22m per hour, 8th, 12M, W.S.W.

Prevailing direction, Southwest.

### Summary.

| | |
|---|---|
| South | 19 per cent |
| South Southwest | 29 " " |
| Southwest | 10 " " |
| Northwest | 10 " " |
| Other directions | 32 " " |

### Weather.

Mean cloudiness observed . . . . 44 per cent

Total cloudiness recorded by the Sun Thermometer . . 170 hours = 40 per cent.

| | |
|---|---|
| Number of clear days | 11 |
| Number of fair days | 12 |
| Number of cloudy days | 8 |

### Bright Sunshine.

Number hours recorded, 259 hrs, = 60 per cent.

**Rain,** 1st, 5th. 6th, 13th, 14th, 18th, 19th, 21st, 24th, 27th, 30th, 31st.

**Thunder and Lightning,** 6th. 21st, 24th, 31st.

**Hail,** 24th.

**Gales,** 35 miles or more per hour: None.

---

*Temperature in ground shelter.

**Reduced to freezing and sea-level.

# DAILY SUMMARY.

| Day. | Barometer Reduced to Sea Level. | | | Temperature. Ground Shelter. | | | | | | | No. Hours of Bright Sunshine |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Maximum | Minimum. | Mean. Semi-daily | Maximum | Time. | Minimum. | Time. | Mean of Max. and Min. | Mean Hourly Draper. | Mean Sensible Wet Bulb. | |
| 1 | 29 82 | 29.69 | 29.723 | 81.0 | 4 P | 58.0 | 12 P | 69.5 | 70.3 | 66.3 | 11.8 |
| 2 | 29.98 | 29.83 | 29.878 | 81.0 | 3 P | 56.0 | 12 P | 68.5 | 67.0 | 61.7 | 13.0 |
| 3 | 29.97 | 29.91 | 29 947 | 78.0 | 3 P | 47.0 | 5 A | 62.5 | 64.7 | 59.5 | 12.7 |
| 4 | 30.03 | 29.95 | 29.981 | 84.0 | 2 P | 56.0 | 2:30 A | 70.0 | 70.7 | 62.7 | 11.5 |
| 5 | 30.05 | 30.01 | 30 032 | 81.0 | 4 P | 55 0 | 6 A | 68.0 | 68.1 | 64.7 | 9.5 |
| 6 | 30 04 | 29.92 | 29.948 | 73.5 | 1 P | 64.0 | 6 A | 68.7 | 68.5 | 67.0 | 0 8 |
| 7 | 29 92 | 29.66 | 29.744 | 85.0 | 4 P | 64.0 | 5 A | 74.5 | 73 0 | 68.5 | 10.7 |
| 8 | 29 98 | 29 64 | 29 788 | 79.0 | 11 A | 56 0 | 12 P | 67.5 | 71.0 | 61.5 | 13.0 |
| 9 | 30.14 | 29.98 | 30.074 | 76 0 | 5 P | 46.0 | 6 A | 61.0 | 61.7 | 56.7 | 13 6 |
| 10 | 30.18 | 30.13 | 30.160 | 79.5 | 4 P | 43 0 | 6 A | 61.3 | 62.2 | 52.5 | 12.9 |
| 11 | 30.21 | 30.17 | 30.191 | 85 0 | 1 P | 49.0 | 6 A | 67.0 | 65.2 | 57.5 | 12.0 |
| 12 | 30.28 | 30.20 | 30.253 | 77.0 | 2 P | 51.0 | 6 A | 64.0 | 65.0 | 59.5 | 9.8 |
| 13 | 30.25 | 30.10 | 30.180 | 71.0 | 1 P | 62.0 | 12 P | 66.5 | 66.2 | 63.7 | 5.5 |
| 14 | 30.10 | 29.88 | 29.919 | 62.0 | 0 A | 55.0 | 5 A | 58.5 | 58.2 | 55 7 | 0.0 |
| 15 | 29.93 | 29.89 | 29.922 | 79.0 | 3 P | 55.5 | 5 A | 67.3 | 65.5 | 60.0 | 10.9 |
| 16 | 30.07 | 29.91 | 29.980 | 84.0 | 3 P | 53.5 | 5:30 A | 68.7 | 67.1 | 60.3 | 11.2 |
| 17 | 30.07 | 30.02 | 30.054 | 75.0 | 3 P | 54.5 | 5 A | 64 7 | 65.5 | 59.7 | 8.7 |
| 18 | 30 07 | 29 99 | 30 015 | 63 0 | 2 P | 58.0 | 7 A | 60.5 | 60.4 | 58.5 | 0.3 |
| 19 | 29 99 | 29 91 | 29.944 | 73 0 | 4 P | 56.5 | 5 A | 64.7 | 63.5 | 61.5 | 4.4 |
| 20 | 30.02 | 29.95 | 29.967 | 79.5 | 4 P | 59.0 | 12 P | 69.3 | 68.8 | 62.5 | 10.5 |
| 21 | 30.08 | 29.84 | 29.954 | 82 5 | 3 P | 50 5 | 6 A | 66.5 | 67.2 | 63.5 | 10.7 |
| 22 | 29.92 | 29.83 | 29 848 | 84.0 | 3 P | 60.0 | 12 P | 72.0 | 71.9 | 64.3 | 10.5 |
| 23 | 29.94 | 29.89 | 29.922 | 85.0 | 3:30 P | 56.5 | 5 A | 70.7 | 69.5 | 63 7 | 11.6 |
| 24 | 29.94 | 29 75 | 29.799 | 88.0 | 2 P | 58.5 | 3:30 A | 73 3 | 69.5 | 63 7 | 5.0 |
| 25 | 29.81 | 29.68 | 29.710 | 71.5 | 3 P | 59.0 | 12 P | 65.3 | 67.1 | 61.0 | 0.0 |
| 26 | 29.84 | 29.73 | 29 794 | 71.0 | 3 P | 49 5 | 6:30 A | 60.3 | 60.7 | 56 3 | 7.0 |
| 27 | 29 87 | 29 75 | 29.786 | 64.0 | 2:30 P | 50 0 | 5 A | 57.0 | 57.9 | 54.7 | 5.4 |
| 28 | 30.00 | 29.87 | 29.910 | 72.5 | 2:30 P | 47.0 | 6 A | 59 7 | 60.1 | 55 3 | 10.5 |
| 29 | 30 08 | 30.00 | 30.060 | 78 0 | 4 P | 48 0 | 6 A | 63 0 | 63 8 | 59 5 | 10.7 |
| 30 | 30.06 | 29.90 | 29.956 | 68.0 | 4 P | 54.0 | 6 A | 61.0 | 63 2 | 62 5 | 1.2 |
| 31 | 29.95 | 29.78 | 29.828 | 75.0 | 2 P | 62.0 | 12 P | 68.5 | 67.1 | 64 5 | 4.0 |

# DAILY SUMMARY.

| Day. | Humidity. | | | Wind. | | | | | Precipitation. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Mean Dew Point. | Mean Force vapor. | Mean Relative Humidit | Prevailing Direction. | Total Movement in Miles. | Maximum Pressure Per Square Ft | Miles per Hour. | Time. | Beginning. | Ending. | Total in Inches. Rain.** | Total in Inches. Snow. |
| 1 | 65.5 | .720 | 84.5 | N.W. | 157 | 1.0 | 14 | 6 P | 0 A | 5 A | .16 | |
| 2 | 57.5 | .698 | 68.5 | N. | 214 | 2 0 | 20 | 2 P | | | | |
| 3 | 55.5 | .620 | 70.0 | W. | 88 | 1.0 | 14 | 12 M | | | | |
| 4 | 58.5 | .732 | 66.5 | S.S W. | 108 | 1.0 | 14 | 3 P | | | | |
| 5 | 63.0 | .696 | 84.5 | S S.W. | 101 | 1.5 | 17 | 6 P | 12 M | 12 P | .04 | |
| 6 | 66 0 | .705 | 90.0 | S. | 107 | 0 0 | — | — | 0 A | 8 P | 07 | |
| 7 | 66.5 | .792 | 84 0 | W. | 84 | 1.0 | 14 | 11 P | | | | |
| 8 | 61.0 | .756 | 54 5 | N.W. | 209 | 2.5 | 22 | 1 P | | | | |
| 9 | 52.5 | .574 | 70.0 | W.N.W. | 75 | 1.0 | 14 | 2 P | | | | |
| 10 | 46.5 | .522 | 62.5 | S. | 43 | 0.5 | 10 | 4 P | | | | |
| 11 | 53 5 | .582 | 71.5 | N.W. | 43 | 0.5 | 10 | 3 P | | | | |
| 12 | 56.5 | .599 | 74.5 | S.S.W. | 50 | 0.0 | — | — | | | | |
| 13 | 61.5 | .668 | 84.0 | S.S.E. | 109 | 0.0 | — | — | 10 P | 12 P | .01 | |
| 14 | 55.0 | .475 | 90.0 | N.E. | 235 | 2.0 | 20 | 10 A | 0 A | 7 P | .13 | |
| 15 | 57 0 | .591 | 79.0 | N. | 70 | 0.5 | 10 | 4 P | | | | |
| 16 | 57 0 | .626 | 76 0 | S.S.W. | 64 | 0.5 | 10 | 3 P | | | | |
| 17 | 56.5 | .617 | 73.5 | S. | 120 | 1.5 | 17 | 3 P | | | | |
| 18 | 58 0 | .502 | 94.5 | E.N E | 81 | 0.0 | — | — | 1 A | 12 P | 1.30 | |
| 19 | 60 5 | .587 | 90.0 | S.E. | 72 | 0.5 | 10 | 9 P | 0 A | 10 P | .09 | |
| 20 | 60.0 | 660 | 78.0 | W.S.W. | 118 | 2.0 | 20 | 2 P | | | | |
| 21 | 61.5 | .671 | 82.5 | S.S.W. | 53 | 1 0 | 14 | 9 P | 8:30 P | 9 P | T | |
| 22 | 61.5 | .710 | 77.5 | S.W. | 118 | 1.0 | 14 | 9 A | | | | |
| 23 | 60.0 | .740 | 69.0 | S.W. | 88 | 0 5 | 10 | 11 A | | | | |
| 24 | 62.0 | .663 | 84.0 | S. | 103 | 2 0 | 20 | 4 P | 3 P | 8 P | 2.07 | |
| 25 | 58.0 | .630 | 77.5 | S.W. | 116 | 1.5 | 17 | 1 P | | | | |
| 26 | 52.0 | .557 | 70.5 | S.S.W. | 102 | 1.0 | 14 | 4 P | | | | |
| 27 | 51.0 | .521 | 63.0 | S.S.W. | 123 | 1.5 | 17 | 4 P | 10 A | 2 P | .14 | |
| 28 | 51.0 | .527 | 71.5 | S.S.W. | 104 | 1 0 | 14 | 1 P | | | | |
| 29 | 56.0 | .604 | 72.5 | S. | 57 | 0.5 | 10 | 2 P | | | | |
| 30 | 61.5 | .600 | 91.0 | S. | 82 | 1.0 | 14 | 11 A | 2 P | 8 P | .20 | |
| 31 | 64.0 | .638 | 92.5 | S.S.W. | 116 | 3.5 | 26 | 3 P | 2:30 P | 4 P | .60 | |

**Rain or melted snow at base of tower. * Included in following day.

## REMARKS

The weather during August was somewhat cooler than usual and rainstorms were rather frequent. Nearly all the precipitation occurred after the middle of the month. The thunderstorm on the 24th was of unusual intensity and more than two inches of rain fell in about four hours. Accompanying the rain there was more or less hail and considerable damage was done in places. The total damage, however, was not as great as at first reported. Several fires were started by the lightning. Two other rather heavy rains occurred on the 18th and 31st.

Owing to the rather low temperature the corn crop did not advance rapidly and at the close of the month from ten days to two weeks of good weather is needed to mature the crop.

The various weather elements show the following features when compared with their normals: The mean barometer was rather low and fluctuations in pressure rather slow. The total wind movement was slightly less than the normal and no gales were registered on the pressure chart. An unusual amount of wind was from the Southwest quadrant.

The mean temperature was about two degrees lower than the normal, and no very high temperatures occurred. The maximum and minimum temperatures were nearly normal. The mean hourly temperature was above 70 degrees on only five days.

The mean dew point was nearly two degrees lower than the normal and the relative humidity a little higher than usual.

The total precipitation was about one-sixth more than the normal.

The amount of bright sunshine was rather large and the number of cloudy days rather small.

J. E. OSTRANDER, Meteorologist.

G. A. SMITH, Observer.

BULLETIN No. 369. SEPTEMBER, 1919

# Meteorological Observations

AT THE

# MASSACHUSETTS
# AGRICULTURAL EXPERIMENT
# STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.
*Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.*
*Height of Wind Instruments 72 ft. Time used, 75th Mer.*

## MONTHLY SUMMARY.

**Pressure.** In inches.

| | |
|---|---|
| Maximum reduced to freezing, | 30.09, 27th, 8 A; 28th, 8 A. |
| Minimum reduced to freezing, | 29.27, 12th, 4 A |
| Reduced maximum reading | 30.39, 27th, 8 A; 28th, 8 A. |
| Reduced minimum reading, | 29.56, 12th, 4 A |
| Mean semi-daily reduced | 30.016 |
| Monthly range | 0.83 |

***Air Temperature.** In Degrees Fahr.

| | |
|---|---|
| Highest | 88.0, 7th, 4 P; 8th, 2 P |
| Lowest | 35.0, 27th, 7 A |
| Mean hourly | 61.7 |
| Mean of means of max. and min. | 61.9 |
| Mean sensible (wet bulb) | 56.5 |
| Monthly range | 53.0 |
| Highest mean daily | 74.8, 8th |
| Lowest mean daily | 50.2, 28th |
| Mean maximum | 72.4 |
| Mean minimum | 51.4 |
| Mean daily range | 21.0 |
| Greatest daily range | 42.0, 28th |
| Least daily range | 3.5, 3rd |

**Humidity.**

| | |
|---|---|
| Mean dew point | 54.6 |
| Mean force of vapor | .525 |
| Mean relative humidity | 84.2 |

**Precipitation.** In inches.

| | |
|---|---|
| Total precipitation, in inches | 4.25 |
| Total snow, in inches | |
| Number of days on which .01 inch or more rain fell | 12 |

*Temperature in ground shelter.
**Reduced to freezing and sea-level.

**Wind.**

| | |
|---|---|
| Total movement | 3244 m |
| Greatest daily movement | 235m, 22d |
| Least daily movement | 35m, 10th |
| Mean daily movement | 108m |
| Mean hourly velocity | 4.5 m |
| Maximum pressure per square foot, | 4.5 lbs 30m per hour, 25th, 3P, S.S.W. |
| Maximum velocity for 5 minutes, | 20m per hour, 25th, 2P, S.S.W. |
| Prevailing direction, | Southwest. |

Summary.

| | |
|---|---|
| South | 27 per cent |
| South Southwest | 17 “ “ |
| North | 13 “ “ |
| North Northeast | 13 “ “ |
| West | 10 “ “ |
| Other directions | 20 “ “ |

**Weather.**

| | |
|---|---|
| Mean cloudiness observed | 54 per cent |
| Total cloudiness recorded by the Sun Thermometer | 194 hours = 52 per cent. |
| Number of clear days | 9 |
| Number of fair days | 9 |
| Number of cloudy days | 12 |

**Bright Sunshine.**

Number hours recorded, 179 hrs,= 48 per cent.

**Rain,** 2d, 3d, 7th. 9th, 10th, 11th, 12th, 15th, 16th, 20th, 22d, 23d, 24th.

**Thunder and Lightning,** 9th. 11th, 24th.

**Frosts,** 18th, 27th, 28th.

**Gales,** 35 miles or more per hour: None.

# DAILY SUMMARY.

| Day. | Barometer Reduced to Sea Level. | | | Temperature. Ground Shelter. | | | | | | | No. Hours of Bright Sunshine |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Maximum | Minimum. | Mean. Semi-daily | Maximum | Time. | Minimum. | Time. | Mean of Max. and Min. | Mean Hourly Draper. | Mean Sensible Wet Bulb. | |
| 1 | 30.14 | 29.95 | 30.058 | 72.5 | 2 P | 58.0 | 6 A | 65.3 | 65.3 | 62.7 | 5.0 |
| 2 | 30.17 | 30.08 | 30.126 | 66.0 | 4 P | 61.0 | 7 A | 63.5 | 64.0 | 63.3 | 0.0 |
| 3 | 30.08 | 29 84 | 29.888 | 65.0 | 3 P | 61.5 | 7 A | 63.3 | 63.3 | 62.7 | 2.3 |
| 4 | 30.15 | 29.88 | 29.998 | 77.0 | 4 P | 54.0 | 12 P | 65 5 | 64.2 | 59.0 | 10.7 |
| 5 | 30.24 | 30.08 | 30.170 | 74.0 | 4 P | 41 5 | 7 A | 58.0 | 58.9 | 53.5 | 11.4 |
| 6 | 30.18 | 30.00 | 30 085 | 82 0 | 2:30 P | 45.5 | 7 A | 63.7 | 65.0 | 60.7 | 8.7 |
| 7 | 30.02 | 29.97 | 30.022 | 88.0 | 4 P | 64.0 | 6 A | 76.0 | 74.7 | 69.3 | 8.8 |
| 8 | 29.97 | 29 84 | 29.891 | 88.0 | 2 P | 58.5 | 12 P | 73 3 | 74.8 | 70.0 | 9.7 |
| 9 | 30.10 | 30.01 | 30.078 | 58.5 | 0 A | 52.0 | 7 A | 55.3 | 53 8 | 52.5 | 0.0 |
| 10 | 30 04 | 29 89 | 29 960 | 68 0 | 3 P | 52.5 | 3 A | 60.3 | 59.8 | 58.5 | 0.0 |
| 11 | 29.89 | 29.60 | 29.656 | 77.0 | 3:30 P | 60.0 | 4 A | 68.5 | 64 6 | 62.0 | 0.0 |
| 12 | 29 84 | 29.56 | 29 658 | 68.0 | 3 P | 57.0 | 12 P | 62.5 | 61.5 | 57.3 | 1.0 |
| 13 | 30.09 | 29.84 | 30.016 | 72.0 | 3 P | 50.0 | 6 A | 61.0 | 60.5 | 54.5 | 11.8 |
| 14 | 30.12 | 30.04 | 30.082 | 74.0 | 2:30 P | 47.5 | 5 A | 60 7 | 60 0 | 54.0 | 8.0 |
| 15 | 30.13 | 30 07 | 30.117 | 59.0 | 0 A | 52.0 | 12 P | 55 5 | 54 0 | 52.0 | 0.0 |
| 16 | 30 07 | 29.87 | 29.960 | 63 0 | 3 P | 52.0 | 0 A | 57.5 | 56.8 | 54.3 | 0.0 |
| 17 | 30.00 | 29 81 | 29.866 | 71.5 | 2 P | 48.0 | 12 P | 59 7 | 59.5 | 51.5 | 10.5 |
| 18 | 30.17 | 30.00 | 30.126 | 69.0 | 4 P | 35.5 | 6:30 A | 52.3 | 52.3 | 43.5 | 11.1 |
| 19 | 30.22 | 30.11 | 30.180 | 72.0 | 1 P | 45.0 | 6 A | 58.5 | 57.3 | 51.0 | 8.5 |
| 20 | 30 11 | 29.99 | 30 028 | 79.5 | 3 P | 56.0 | 0 A | 68.3 | 66 5 | 63.3 | 4.5 |
| 21 | 30.08 | 29 98 | 30.026 | 74.0 | 4 P | 63.0 | 3 A | 68.5 | 68.0 | 65.7 | 0.5 |
| 22 | 29.98 | 29.82 | 29.894 | 71.0 | 4 P | 66.0 | 5 A | 68.5 | 69.0 | 67 5 | 0.0 |
| 23 | 29.94 | 29.80 | 29 892 | 69.0 | 0 A | 51.0 | 12 P | 60.0 | 58.8 | 56.0 | 0.3 |
| 24 | 29.94 | 29 76 | 29 885 | 71.0 | 4 P | 42.0 | 6:30 A | 56.5 | 54 6 | 48.0 | 10.4 |
| 25 | 29.89 | 29 67 | 29 778 | 77.5 | 3 P | 54 5 | 7 A | 66.0 | 63.0 | 54.5 | 9.1 |
| 26 | 30.24 | 29.89 | 30.114 | 66.5 | 3 P | 45.0 | 12 P | 55.5 | 55.7 | 48 5 | 11.0 |
| 27 | 30.39 | 30.24 | 30.377 | 68.0 | 4 P | 35 0 | 7 A | 51.5 | 50.2 | 43 7 | 10.8 |
| 28 | 30.39 | 30 27 | 30.353 | 78.5 | 4 P | 36 5 | 6 A | 57 5 | 56.2 | 49.7 | 10.2 |
| 29 | 30.32 | 30.09 | 30.218 | 76 0 | 3 P | 45 5 | 4 A | 60.7 | 59.2 | 55.0 | 7.7 |
| 30 | 30.18 | 29.99 | 30.088 | 75.0 | 1-30 P | 51.0 | 12 P | 63.0 | 60 5 | 52.3 | 6 7 |

# DAILY SUMMARY.

| Day. | Humidity. | | | Wind. | | | | | Precipitation. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Total in Inches. | |
| | Mean Dew Point. | Mean Force vapor. | Mean Relative Humidit | Prevailing Direction. | Total Movement in Miles. | Maximum Pressure Per Square Ft | Miles per Hour. | Time. | Beginning. | Ending. | Rain.** | Snow. |
| 1 | 62.0 | .660 | 91.0 | N.N E. | 70 | 0 0 | — | — | | | | |
| 2 | 61.5 | .586 | 93.0 | N.N.E. | 105 | 0.0 | — | — | 0 A | 12 P | .63 | |
| 3 | 62.5 | .583 | 96.0 | N. | 88 | 0.5 | 10 | 9 A | 0 A | 6 P | 1.40 | |
| 4 | 57.0 | .555 | 84.0 | N. | 106 | 1.0 | 14 | 1 P | | | | |
| 5 | 51.0 | .462 | 82 5 | S.W. | 81 | 1.5 | 17 | 4 P | | | | |
| 6 | 65.5 | .644 | 78.5 | S. | 109 | 1.0 | 14 | 3 P | | | | |
| 7 | 67.5 | .837 | 80.5 | S. | 96 | 0 5 | 10 | 2 P | 6 A | 7 A | T | |
| 8 | 67.5 | .872 | 78.0 | W.S.W. | 124 | 1.5 | 17 | 9 P | | | | |
| 9 | 51.5 | .402 | 94.0 | N.N.E. | 80 | 0.0 | — | — | 3 A | 4 P | 1 18 | |
| 10 | 58.0 | .512 | 94.0 | W.N.W. | 35 | 0.0 | — | — | 5 P | 12 P | .05 | |
| 11 | 61.5 | .576 | 94.5 | S. | 73 | 0.0 | — | — | 0 A | 12 P | .28 | |
| 12 | 56 0 | .498 | 90.0 | W. | 120 | 2 0 | 20 | 3 P | 0 A | 7 P | .09 | |
| 13 | 50.5 | .503 | 72.5 | N.W. | 185 | 2.0 | 20 | 10 A | | | | |
| 14 | 51.0 | .489 | 77.0 | S.S.W. | 58 | 0.5 | 10 | 3 P | | | | |
| 15 | 51.0 | .410 | 91.0 | N.N.E. | 47 | 0.0 | — | — | 4 A | 10 P | .20 | |
| 16 | 53 0 | .447 | 90.0 | S. | 81 | 0.5 | 10 | 4 P | 9 A | 12 M | .02 | |
| 17 | 47 0 | .452 | 71.0 | W. | 97 | 1.0 | 14 | 1 P | | | | |
| 18 | 37.0 | .345 | 64 5 | S.E. | 82 | 1.0 | 14 | 3 P | | | | |
| 19 | 47.5 | .433 | 76.0 | S. | 186 | 2.0 | 20 | 2 P | | | | |
| 20 | 62.0 | .644 | 88.5 | S. | 191 | 1.5 | 17 | 6 A | 3 A | 7 A | .01 | |
| 21 | 65.0 | .685 | 89.0 | S. | 88 | 1.5 | 17 | 10 P | | | | |
| 22 | 67.0 | .715 | 92.5 | S.S.W. | 235 | 2.5 | 22 | 9 A | 8 A | 12 P | .24 | |
| 23 | 54.5 | .490 | 88.5 | N. | 100 | 1.0 | 14 | 12 M | 0 A | 5 P | .19 | |
| 24 | 46.5 | .377 | 89.5 | N.W. | 89 | 1.5 | 17 | 6 P | 5 P | 7 P | .16 | |
| 25 | 51.5 | .492 | 78.0 | S.S.W. | 222 | 4.5 | 30 | 3 P | | | | |
| 26 | 44.5 | .395 | 75 0 | N. | 103 | 0.0 | — | — | | | | |
| 27 | 41.0 | .316 | 84.0 | S.S.W. | 65 | 0 0 | — | — | | | | |
| 28 | 48.5 | .405 | 89.5 | S. | 46 | 0.0 | — | — | | | | |
| 29 | 52.5 | .488 | 84.0 | S.S W. | 93 | 2.5 | 22 | 3 P | | | | |
| 30 | 47.5 | .478 | 70.0 | W. | 189 | 1.5 | 17 | 3 P | | | | |

**Rain or melted snow at base of tower.  * Included in following day.

## REMARKS

The weather during the month was rather gloomy on the whole, and rainstorms were quite numerous. While most of the storms were small, the two storms early in the month were unusually heavy, and over three-fourths of the total precipitation occurred during the first third of the month. There was considerable cloudiness without precipitation, so that the total cloudiness was rather high. Only a few light frosts were noted, and practically no damage resulted. At the close of the month the transition to Autumn was practically complete.

A comparison of the records of the several weather elements with their respective normals shows the following features of interest; The mean barometer was slightly lower than the normal, while the range of pressure was nearly the usual amount. The maximum and minimum pressures were both lower than their normals. The total wind movement was slightly less than usual, and no gales were recorded. The percentage of south wind was large.

The mean hourly temperature varied but little from the normal, and the minimum temperature was not quite as low as usual. The mean hourly temperature on the 9th was 21 degrees lower than on the 8th—an exceptionally rapid change.

The mean dew point was higher than the normal and the relative humidity unusually high.

The total precipitation was but little greater than the average value, and has been commented on above.

J. E. OSTRANDER, Meteorologist.

G. A. SMITH, Observer.

BULLETIN No. 370. OCTOBER, 1919

# Meteorological Observations
AT THE
# MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.
*Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.*
*Height of Wind Instruments 72 ft. Time used, 75th Mer.*

## MONTHLY SUMMARY.

### **Pressure.** In inches.

| | |
|---|---|
| Maximum reduced to freezing | 30.30, 30th, 8 A |
| Minimum reduced to freezing | 29.26, 28th, 3 P |
| Reduced maximum reading | 30.61, 30th, 8 A |
| Reduced minimum reading | 29.55, 28th, 3 P |
| Mean semi-daily reduced | 30.123 |
| Monthly range | 1.06 |

### ***Air Temperature.** In Degrees Fahr.

| | |
|---|---|
| Highest | 81.5, 3d, 1 P |
| Lowest | 27.0, 30th, 4 A |
| Mean hourly | 51.2 |
| Mean of means of max. and min. | 51.6 |
| Mean sensible (wet bulb) | 47.1 |
| Monthly range | 54.5 |
| Highest mean daily | 65.2. 3d |
| Lowest mean daily | 34.8, 30th |
| Mean maximum | 62.2 |
| Mean minimum | 41.1 |
| Mean daily range | 21.1 |
| Greatest daily range | 36.0, 7th, 9th |
| Least daily range | 7.0, 4th |

### **Humidity.**

| | |
|---|---|
| Mean dew point | 44.6 |
| Mean force of vapor | .378 |
| Mean relative humidity | 83.8 |

### **Precipitation.** In inches.

| | |
|---|---|
| Total precipitation, in inches | 1.81 |
| Total snow, in inches | |
| Number of days on which .01 inch or more rain fell | 13 |

### **Wind.**

| | |
|---|---|
| Total movement | 2914 m |
| Greatest daily movement | 199m, 11th |
| Least daily movement | 19m, 30th |
| Mean daily movement | 94m |
| Mean hourly velocity | 3.9 m |

Maximum pressure per square foot, 8.5 lbs 41m per hour, 28th, 3P, W.

Maximum velocity for 5 minutes, 24m per hour, 28th, 3P, W.

Prevailing direction, Southwest.

### Summary.

| | |
|---|---|
| South | 19 per cent |
| South Southwest | 16 " " |
| South Southeast | 10 " " |
| West | 10 " " |
| Northwest | 10 " " |
| Other directions | 35 " " |

### **Weather.**

| | |
|---|---|
| Mean cloudiness observed | 57 per cent |
| Total cloudiness recorded by the Sun Thermometer | 193 hours = 57 per cent. |
| Number of clear days | 4 |
| Number of fair days | 12 |
| Number of cloudy days | 15 |

### **Bright Sunshine.**

Number hours recorded, 148 hrs, = 43 per cent.

**Rain**, 2d, 3d, 6th, 9th, 11th, 16th, 17th, 21st, 26th, 27th, 28th, 30th, 31st.

**Frosts**, 8th, 9th, 13th, 29th.

**Hail**, 30th

**Gales**, 35 miles or more per hour: 41m, 28th, W.

*Temperature in ground shelter.

**Reduced to freezing and sea-level.

# DAILY SUMMARY.

| Day. | Barometer Reduced to Sea Level. | | | Temperature. Ground Shelter. | | | | | | | No. Hours of Bright Sunshine |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Maximum | Minimum. | Mean. Semi-daily | Maximum | Time. | Minimum. | Time. | Mean of Max. and Min. | Mean Hourly Draper. | Mean Sensible Wet Bulb. | |
| 1 | 30.25 | 30.14 | 30.224 | 64.5 | 4 P | 42.5 | 12 P | 53.5 | 50.7 | 45.3 | 7.0 |
| 2 | 30.20 | 29.88 | 30.074 | 56.0 | 12 P | 42.5 | 0 A | 49.3 | 49.7 | 49.0 | 0.0 |
| 3 | 30.07 | 29.81 | 29.904 | 81.5 | 1 P | 56.0 | 0 A | 68.7 | 65.2 | 58.0 | 7.0 |
| 4 | 30.11 | 30.02 | 30.082 | 61.0 | 12 P | 54.0 | 6 A | 57.5 | 57.6 | 56.3 | 0.0 |
| 5 | 30.02 | 29.90 | 29.974 | 68.5 | 5 P | 59.5 | 2 A | 64.0 | 63.7 | 62.3 | 1.5 |
| 6 | 29.90 | 29.69 | 29.809 | 74.0 | 3 P | 47.0 | 12 P | 60.5 | 65.0 | 59.7 | 2.0 |
| 7 | 30.16 | 29.88 | 29.953 | 67.0 | 2 P | 31.0 | 12 P | 49.0 | 49.6 | 41.5 | 10.5 |
| 8 | 30.40 | 29.88 | 30.380 | 58.0 | 4:30 P | 31.0 | 6 A | 44.5 | 40.5 | 34.0 | 10.5 |
| 9 | 30.44 | 30.20 | 30.349 | 64.0 | 2 P | 28.0 | 7 A | 46.0 | 48.2 | 45.7 | 7.5 |
| 10 | 30.20 | 29.92 | 30.051 | 79.0 | 4 P | 59.0 | 0 A | 69.0 | 62.5 | 62.5 | 8.0 |
| 11 | 29.98 | 29.91 | 29.943 | 75.0 | 9:30 A | 50.0 | 12 P | 62.5 | 62.1 | 57.7 | 5.5 |
| 12 | 30.17 | 29.98 | 30.021 | 50.0 | 0 A | 35.0 | 12 P | 42.5 | 45.3 | 39.5 | 2.1 |
| 13 | 30.37 | 30.17 | 30.346 | 61.0 | 3 P | 28.0 | 6 A | 44.5 | 43.6 | 36.0 | 10.2 |
| 14 | 30.33 | 30.05 | 30.200 | 52.0 | 6 P | 37.0 | 6 A | 44.5 | 44.4 | 37.7 | 0.0 |
| 15 | 30.12 | 30.03 | 30.116 | 68.0 | 4 P | 48.5 | 0 A | 58.3 | 56.6 | 53.7 | 6.0 |
| 16 | 30.10 | 29.77 | 29.943 | 66.0 | 6 P | 54.0 | 6 A | 60.0 | 59.5 | 58.5 | 0.0 |
| 17 | 30.14 | 29.77 | 30.043 | 64.0 | 3 P | 39.5 | 12 P | 51.7 | 53.5 | 45.0 | 8.7 |
| 18 | 30.28 | 30.14 | 30.117 | 60.0 | 3 P | 33.0 | 7 A | 46.5 | 45.2 | 38.5 | 10.0 |
| 19 | 30.20 | 30.03 | 30.117 | 64.0 | 2 P | 32.5 | 6 A | 48.3 | 47.5 | 43.3 | 7.0 |
| 20 | 30.40 | 30.20 | 30.397 | 48.5 | 3 P | 37.0 | 7 A | 42.7 | 42.3 | 37.0 | 2.0 |
| 21 | 30.37 | 29.97 | 30.175 | 52.0 | 11 P | 34.0 | 1 A | 43.0 | 42.1 | 44.0 | 0.0 |
| 22 | 30.21 | 29.96 | 30.065 | 58.0 | 3 P | 41.0 | 12 P | 49.5 | 51.5 | 47.3 | 7.2 |
| 23 | 30.34 | 30.21 | 30.278 | 57.0 | 3 P | 32.0 | 7 A | 44.5 | 45.4 | 42.0 | 6.3 |
| 24 | 30.27 | 30.20 | 30.230 | 62.0 | 3 P | 41.0 | 12 P | 51.5 | 50.5 | 44.0 | 8.0 |
| 25 | 30.38 | 30.10 | 30.254 | 61.0 | 4 P | 40.0 | 0 A | 50.5 | 49.9 | 44.5 | 5.2 |
| 26 | 30.10 | 29.95 | 29.985 | 60.5 | 1 P | 50.0 | 2 A | 55.3 | 56.3 | 55.0 | 0.0 |
| 27 | 30.04 | 29.95 | 30.030 | 62.0 | 2 P | 50.0 | 6:30 A | 56.0 | 55.5 | 53.3 | 2.6 |
| 28 | 30.00 | 29.55 | 29.815 | 74.0 | 2-30 P | 45.0 | 12 P | 59.5 | 54.4 | 47.3 | 3.0 |
| 29 | 30.51 | 30.00 | 30.392 | 51.0 | 3:30 P | 30.0 | 12 P | 40.5 | 41.1 | 33.3 | 8.5 |
| 30 | 30.61 | 30.33 | 30.529 | 41.0 | 4 P | 27.0 | 4 A | 34.0 | 34.8 | 33.3 | 0.0 |
| 31 | 30.33 | 29.73 | 29.906 | 67.0 | 3:30 P | 38.0 | 0 A | 52.5 | 54.5 | 55.0 | 1.5 |

# DAILY SUMMARY.

| Day. | Humidity. | | | Wind. | | | | | Precipitation. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Mean Dew Point. | Mean Force vapor. | Mean Relative Humidit | Prevailing Direction. | Total Movement in Miles. | Maximum Pressure Per Square Ft | Miles per Hour. | Time. | Beginning. | Ending. | Total in Inches. Rain.** | Total in Inches. Snow. |
| 1 | 42.5 | .338 | 81.0 | W.N.W. | 82 | 0.0 | — | — | | | | |
| 2 | 47.5 | .370 | 90.0 | S. | 50 | 0.0 | — | — | 9 A | 8 P | .21 | |
| 3 | 55.5 | .537 | 84.0 | S.S E. | 72 | 0.0 | — | — | 3 A | 1 P | .01 | |
| 4 | 55.5 | .480 | 92.5 | S.S.W. | 51 | 0.0 | — | — | | | | |
| 5 | 61.5 | .581 | 93.5 | S. | 46 | 0.0 | — | — | | | | |
| 6 | 57.5 | .578 | 82.5 | S.S.E. | 176 | 3.5 | 26 | 5 P | 2 A | 1 P | .07 | |
| 7 | 34.5 | .343 | 63.0 | N.N.W. | 175 | 4.0 | 28 | 4 P | | | | |
| 8 | 27.5 | .239 | 63.0 | S.E. | 78 | 0.0 | — | — | | | | |
| 9 | 43.5 | .331 | 93.0 | S.S.W. | 132 | 3.0 | 24 | 11 P | 4 P | 12 P | .26 | |
| 10 | 61.0 | .625 | 87.0 | S.S.W. | 185 | 2.0 | 20 | 3 P | | | | |
| 11 | 56.0 | .534 | 88.0 | N.W. | 199 | 3.5 | 26 | 11 A | 9 P | 11 P | .01 | |
| 12 | 34.5 | .279 | 73.5 | N.N.E. | 111 | 0.0 | — | — | | | | |
| 13 | 29.0 | .250 | 65 0 | W. | 57 | 0.0 | — | — | | | | |
| 14 | 41.0 | .293 | 90 5 | S.W. | 37 | 0.0 | — | — | | | | |
| 15 | 57 0 | .513 | 93.5 | S. | 49 | 0.0 | — | — | | | | |
| 16 | 58.0 | .509 | 97.0 | S.S.W. | 65 | 2.0 | 20 | 12 M | 11 A | 12 P | .39 | |
| 17 | 42.0 | .337 | 79.5 | N.W. | 173 | 0.0 | — | — | 0 A | 2 A | .06 | |
| 18 | 36 0 | .257 | 84 0 | S. | 51 | 0.5 | 10 | 3 P | | | | |
| 19 | 40.0 | .311 | 84.0 | S S.W. | 74 | 1.0 | 14 | 3 P | | | | |
| 20 | 33 0 | .246 | 76.0 | N.E. | 110 | 0.5 | 10 | 2 A | | | | |
| 21 | 42.5 | .308 | 92.0 | W. | 32 | 0.5 | 10 | 9 P | 4 P | 11 P | .06 | |
| 22 | 45.5 | .352 | 88.0 | W. | 150 | 2.5 | 22 | 11 A | | | | |
| 23 | 40.0 | .290 | 89.5 | S. | 30 | 0.0 | — | — | | | | |
| 24 | 41.0 | .327 | 79 0 | S.S.E. | 40 | 0.0 | — | — | | | | |
| 25 | 42.5 | .331 | 85.5 | W.S.W. | 57 | 0.0 | — | — | | | | |
| 26 | 53.5 | .465 | 91.0 | S. | 148 | 1.5 | 17 | 5 A | 12 M | 3 P | .06 | |
| 27 | 52.0 | .430 | 89.5 | N. | 53 | 0.0 | — | — | 7 P | 12 P | .06 | |
| 28 | 41.5 | .382 | 73.0 | N.W. | 178 | 8.5 | 41 | 3 P | 0 A | 1 P | .48 | |
| 29 | 27.0 | .219 | 67.0 | N.N.E. | 154 | 2.0 | 20 | 4 A | | | | |
| 30 | 31.0 | .201 | 88.5 | N.N.W. | 19 | 0.0 | — | — | 3 A | 1 P | .02 | |
| 31 | 54 0 | .469 | 92.5 | S.E. | 80 | 0.5 | 10 | 10 A | 2 A | 12 P | .12 | |

**Rain or melted snow at base of tower. * Included in following day.

## REMARKS

The weather during October was generally gloomy, owing to the large amount of cloudiness and considerable fog. While precipitation occurred on nearly half the days the total amount was small. Much of the wind was from the southwest quadrant. Changes in temperature were rather rapid at times, although the extremes for the month were not unusual.

The records of the several weather elements compared with the normals show the following features: The mean barometer was high even for October—a month with a high normal pressure. Both the maximum and minimum pressures were considerably above their normals. The range of pressure was about the usual amount. The total wind movement was only about 70 per cent of the normal and there were no days showing a very large movement. Only one gale was registered and that was of moderate intensity and of rather short duration.

The mean hourly temperature was about one degree higher than usual, and the mean of maximum and minimum readings slightly more. The maximum temperature came early in the month and was 2½ degrees higher than the normal. The minimum temperature was about 4 degrees higher than the normal.

The mean dew point was several degrees higher than usual and the relative humidity several points above the normal.

The total precipitation was nearly 50 per cent of the normal and occurred in numerous small rains. Early in the morning of the 30th there was a storm of sleet and hail for a short period.

Both the observed cloudiness and the record of the sunshine recorder show that the month was considerably deficient in sunshine.

J. E. OSTRANDER, Meteorologist.

G. A. SMITH, Observer.

BULLETIN No. 371. NOVEMBER, 1919

# Meteorological Observations
AT THE
# MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.
*Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.*
*Height of Wind Instruments 72 ft. Time used, 75th Mer.*

## MONTHLY SUMMARY.

### **Pressure.** In inches.

| | |
|---|---|
| Maximum reduced to freezing | 30.21, 10th, 7 A |
| Minimum reduced to freezing | 29.08, 30th, 5 A |
| Reduced maximum reading | 30.53, 10th, 7 A |
| Reduced minimum reading | 29.37, 30th, 5 A |
| Mean semi-daily reduced | 30.084 |
| Monthly range | 1.16 |

### ***Air Temperature.** In Degrees Fahr.

| | |
|---|---|
| Highest | 70.0, 1st, 1 P |
| Lowest | 17.0, 21st, 7 A |
| Mean hourly | 39.6 |
| Mean of means of max. and min. | 40.1 |
| Mean sensible (wet bulb) | 35.6 |
| Monthly range | 53.0 |
| Highest mean daily | 61.7. 1st |
| Lowest mean daily | 26.4, 20th |
| Mean maximum | 48.5 |
| Mean minimum | 31.6 |
| Mean daily range | 16.9 |
| Greatest daily range | 35.0, 10th |
| Least daily range | 7.5, 26th |

### **Humidity.**

| | |
|---|---|
| Mean dew point | 31.5 |
| Mean force of vapor | .237 |
| Mean relative humidity | 79.1 |

### **Precipitation.** In inches.

| | |
|---|---|
| Total precipitation, in inches | 6.20 |
| Total snow, in inches | Trace |
| Number of days on which .01 inch or more rain fell | 10 |

### **Wind.**

| | |
|---|---|
| Total movement | 5207 m |
| Greatest daily movement | 436m, 6th |
| Least daily movement | 27m, 29th |
| Mean daily movement | 174m |
| Mean hourly velocity | 7.2 m |

Maximum pressure per square foot, 8.0 lbs 40m per hour, 30th, 8A, S.S.W.

Maximum velocity for 5 minutes, 30m per hour, 30th, 3A, S.S.W.

Prevailing direction, West.

### Summary.

| | |
|---|---|
| South | 13 per cent |
| North | 13 " " |
| South Southwest | 13 " " |
| North Northeast | 10 " " |
| West | 10 " " |
| West Northwest | 10 " " |
| Other directions | 31 " " |

### **Weather.**

| | |
|---|---|
| Mean cloudiness observed | 53 per cent |
| Total cloudiness recorded by the Sun Thermometer | 170 hours = 58 per cent. |
| Number of clear days | 6 |
| Number of fair days | 9 |
| Number of cloudy days | 15 |

### **Bright Sunshine.**

Number hours recorded, 123 hrs, = 42 per cent.

**Rain.** 2d, 1st, 2d, 5th. 11th, 12th, 13th, 19th, 22d, 26th, 27th, 29th, 30th.

**Snow.** 5th, 19th.

**Gales.** 35 miles or more per hour: 35m, 20th, N.W.; 40m, 30th, W.S.W.

*Temperature in ground shelter.
**Reduced to freezing and sea-level.

# DAILY SUMMARY.

| Day. | Barometer Reduced to Sea Level. | | | Temperature. Ground Shelter. | | | | | | | No. Hours of Bright Sunshine |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Maximum | Minimum. | Mean. Semi-daily | Maximum | Time. | Minimum. | Time. | Mean of Max. and Min. | Mean Hourly Draper. | Mean Sensible Wet Bulb. | |
| 1 | 29.73 | 29.57 | 29.679 | 70.0 | 1 P | 53.0 | 12 P | 61.5 | 61.7 | 58.0 | 3.7 |
| 2 | 30.07 | 29.56 | 29.848 | 57.0 | 1:30 P | 34.0 | 12 P | 45.5 | 46.3 | 45.7 | 6.8 |
| 3 | 30.20 | 30.07 | 30.162 | 48.5 | 2 P | 26 5 | 6 A | 37.5 | 37.0 | 31.5 | 7.0 |
| 4 | 30.16 | 29.78 | 30 028 | 47.5 | 2 P | 37.0 | 6 A | 42.3 | 43.0 | 39 3 | 3.2 |
| 5 | 29.78 | 29 54 | 29.629 | 45.0 | 0 A | 35 0 | 9 A | 40.0 | 39.0 | 34.0 | 0.0 |
| 6 | 30.16 | 29.71 | 30.062 | 44.5 | 1 P | 36.0 | 12 P | 40.3 | 39.3 | 33 7 | 3.8 |
| 7 | 30.30 | 30.16 | 30.279 | 45.0 | 3 P | 33.0 | 6 A | 39.0 | 38.2 | 34 7 | 1.1 |
| 8 | 30.42 | 30.30 | 30.398 | 50.0 | 2:30 P | 34.0 | 6 A | 42.0 | 38.7 | 32.7 | 5.9 |
| 9 | 30 44 | 30.35 | 30.434 | 53.0 | 3 P | 27 5 | 6 A | 40.3 | 37.0 | 32.3 | 8.7 |
| 10 | 30.53 | 30.36 | 30.455 | 58.0 | 3 P | 23 0 | 7:30 A | 40.5 | 37.6 | 31.0 | 8.1 |
| 11 | 30 36 | 30.25 | 30.342 | 49.0 | 5 P | 30 0 | 5 A | 39.5 | 41.8 | 42 3 | 0.0 |
| 12 | 30.34 | 30.10 | 30 235 | 35.0 | 3:30 P | 47.0 | 6 A | 51.0 | 50.9 | 49.7 | 0 0 |
| 13 | 30.10 | 29.97 | 30.051 | 54.0 | 6:30 A | 34.0 | 12 P | 44.0 | 44.2 | 42.5 | 0.7 |
| 14 | 30.16 | 30.04 | 30.126 | 42.0 | 2 P | 30.0 | 8 A | 36.0 | 34.5 | 28.7 | 8.7 |
| 15 | 30.40 | 30.05 | 30.332 | 40.0 | 2 P | 26 0 | 12 P | 33.0 | 32.3 | 28 5 | 7.5 |
| 16 | 30.43 | 30.24 | 30.362 | 46.5 | 3 P | 21.0 | 7 A | 33.7 | 33.3 | 27.0 | 6.9 |
| 17 | 30.24 | 29.97 | 30.153 | 56.0 | 2-30 P | 35.0 | 6 A | 45.5 | 43.8 | 39.0 | 5.9 |
| 18 | 29 97 | 29 58 | 29.700 | 58 0 | 2:30 P | 36.0 | 12 P | 47.0 | 44.8 | 40.2 | 5.6 |
| 19 | 29.84 | 29 57 | 29 715 | 37.0 | 0 A | 27.0 | 12 P | 32.0 | 32.8 | 28.5 | 2.7 |
| 20 | 30 46 | 29 84 | 30.252 | 33.0 | 3 P | 22.0 | 8 A | 27.5 | 26.4 | 22.0 | 8.4 |
| 21 | 30 50 | 30 22 | 30.406 | 51.0 | 1:30 P | 17.0 | 7 A | 34.0 | 34.7 | 29 0 | 5 9 |
| 22 | 30.22 | 29.58 | 29.894 | 49 0 | 3:30 P | 39.0 | 2 A | 44.0 | 43.8 | 39.7 | 0.0 |
| 23 | 29.64 | 29.50 | 29 579 | 49.0 | 1:30 P | 33.0 | 12 P | 41.0 | 40.4 | 32.5 | 5.0 |
| 24 | 30.01 | 29 63 | 29.840 | 46.5 | 2 P | 25.5 | 8 A | 36.0 | 35.6 | 28.3 | 8.5 |
| 25 | 30.16 | 29.96 | 30 075 | 48.0 | 4 P | 29.0 | 7:30 A | 38.5 | 40 0 | 36.0 | 1.7 |
| 26 | 30.11 | 30.01 | 30 095 | 45 0 | 0 A | 37.5 | 12 P | 41.3 | 41.5 | 41.0 | 0.0 |
| 27 | 30.29 | 30.02 | 30.222 | 41.0 | 3 P | 33.0 | 12 P | 37.0 | 37.7 | 36.0 | 0.0 |
| 28 | 30.49 | 30.29 | 30.475 | 33.0 | 0 A | 24.5 | 9 A | 28.7 | 29.2 | 27.0 | 0.0 |
| 29 | 30.34 | 29 55 | 30.106 | 44.0 | 12 P | 30.0 | 0 A | 37.0 | 33.8 | 33.0 | 0.0 |
| 30 | 29.91 | 29.37 | 29.590 | 61.0 | 2:30 A | 34.0 | 12 P | 47.5 | 49.3 | 43.7 | 7.0 |

# DAILY SUMMARY.

| | Humidity. | | | Wind. | | | | | Precipitation. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Total in Inches. | |
| Day. | Mean Dew Point. | Mean Force vapor. | Mean Relative Humidit | Prevailing Direction. | Total Movement in Miles. | Maximum Pressure Per Square Ft | Miles per Hour. | Time. | Beginning. | Ending. | Rain.** | Snow. |
| 1 | 56.5 | .517 | 89.0 | N.W. | 86 | 0.5 | 10 | 10 A | 0 A | 12 P | .38 | |
| 2 | 34.5 | .272 | 74.0 | N. | 264 | 3.0 | 24 | 10 A | 0 A | 10 A | .93 | |
| 3 | 27.5 | .202 | 77.0 | N.E. | 117 | 1.0 | 14 | 6 P | | | | |
| 4 | 35.5 | .267 | 78.0 | E.S.E. | 103 | 1.0 | 14 | 2 P | | | | |
| 5 | 29.0 | .221 | 74.0 | N.N.W. | 308 | 4.5 | 30 | 7 P | 2 A | 12 M | .97 | T |
| 6 | 27.0 | .227 | 64.0 | N. | 436 | 4.5 | 30 | 1 P | | | | |
| 7 | 29.5 | .227 | 72.5 | N.N.E. | 205 | 2.0 | 20 | 8 A | | | | |
| 8 | 28.0 | .209 | 75.0 | N.N.E. | 97 | 2.0 | 20 | 12 P | | | | |
| 9 | 29.5 | .196 | 83.0 | N. | 150 | 0.5 | 10 | 11 A | | | | |
| 10 | 25.5 | .200 | 73.5 | S.S.W. | 38 | 0.0 | — | — | | | | |
| 11 | 41.5 | .278 | 94.0 | S. | 52 | 0.5 | 10 | 5 P | 2 A | 12 P | 19 | |
| 12 | 48.5 | .376 | 92.0 | S. | 66 | 1.5 | 17 | 4 P | 0 A | 12 P | .24 | |
| 13 | 41.0 | .298 | 90.5 | N.N.W. | 130 | 2.0 | 20 | 10 P | 0 A | 12 P | .62 | |
| 14 | 22.5 | .180 | 67.5 | W. | 186 | 1.5 | 17 | 2 A | | | | |
| 15 | 24.5 | .169 | 78.5 | W. | 164 | 1.5 | 17 | 9 A | | | | |
| 16 | 22.5 | .175 | 75.5 | S. | 109 | 1.5 | 17 | 11 A | | | | |
| 17 | 35.0 | .271 | 77.5 | S. | 159 | 2.0 | 20 | 2 P | | | | |
| 18 | 38.5 | .263 | 86.0 | S.S.W. | 213 | 2.0 | 20 | 10 A | | | | |
| 19 | 22.0 | .180 | 68.0 | W.N.W. | 217 | 3.0 | 24 | 7 P | 6 P | 7 P | | T |
| 20 | 17.5 | .130 | 74.5 | W.N.W. | 394 | 6.0 | 35 | 1 A | | | | |
| 21 | 20.5 | .198 | 61.5 | S.S.W. | 106 | 0.5 | 10 | 5 P | | | | |
| 22 | 34.5 | .285 | 71.5 | S.S.W. | 224 | 3.0 | 24 | 8 P | 10 P | 11 P | T | |
| 23 | 26.5 | .214 | 68.5 | S.W. | 241 | 4.0 | 28 | 12 M | | | | |
| 24 | 21.5 | .181 | 67.0 | W. | 109 | 1.5 | 17 | 2 P | | | | |
| 25 | 33.0 | .232 | 84.5 | S.W. | 236 | 5.0 | 32 | 6 P | | | | |
| 26 | 41.0 | .257 | 100.0 | E. | 97 | 0.0 | — | — | 8 A | 12 P | 1.59 | |
| 27 | 33.0 | .217 | 86.5 | N.N.E. | 161 | 1.0 | 14 | 6 A | 0 A | 4 A | .47 | |
| 28 | 26.0 | .152 | 94.5 | N. | 135 | 1.0 | 14 | 1 A | | | | |
| 29 | 32.0 | .193 | 95.0 | S.E. | 27 | 0.0 | — | — | 1 P | 12 P | .56 | |
| 30 | 40.0 | .336 | 79.0 | W.N.W. | 377 | 8.0 | 40 | 8 A | 0 A | 4 A | .25 | |

**Rain or melted snow at base of tower.　　* Included in following day.

# REMARKS

The weather during November was more stormy than usual, and the change in weather conditions rather rapid in several instances Several heavy rainstorms occurred, and the precipitation during the storm of the 26th—27th was more than two inches. Only traces of snow were noted. The amount of sunshine was small and the last week of the month was especially gloomy. While thin ice formed on several dates no especially cold weather occurred, and the ground was practically free from frost when the month closed.

The records of the several weather elements show the following features: The mean barometer was higher than the normal and the range of pressure slightly less than usual. The rapid fall in pressure during the storm on the 29th and the rise on the 30th after the storm were noticeable features. The wind movement was considerably more than the normal and the wind direction more variable than usual.

The mean hourly temperature showed that the month was slightly warmer than usual, and both the maximum and minimum temperatures were several degrees above their normals. A rise in temperature of nearly twenty degrees in two hours near midnight of the 29th was a very abnormal feature.

The mean dew point was about a degree above the normal and the relative humidity several points higher than usual.

The total precipitation was nearly twice the normal and nearly all of it occurred either during the first five days of the month or the last five days of the month.

The amount of sunshine was nearly normal, although one-half the number of days were recorded as cloudy or overcast.

J. E. OSTRANDER, Meteorologist.

G. S. SMITH, Observer.

BULLETIN No. 372. DECEMBER, 1919

# Meteorological Observations

AT THE

# MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.
*Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.*
*Height of Wind Instruments 72 ft. Time used, 75th Mer.*

## MONTHLY SUMMARY.

### **Pressure.** In inches.

| | |
|---|---|
| Maximum reduced to freezing | 30.35, 11th, 11 A |
| Minimum reduced to freezing | 29.10, 7th, 1 P |
| Reduced maximum reading | 30.67, 11th, 11 A |
| Reduced minimum reading | 29.41, 7th, 1 P |
| Mean semi-daily reduced | 30.111 |
| Monthly range | 1.26 |

### ***Air Temperature.** In Degrees Fahr.

| | |
|---|---|
| Highest | 54 0, 13th, 3 P |
| Lowest | -9.0, 18th, 7 A |
| Mean hourly | 23.4 |
| Mean of means of max. and min. | 23.2 |
| Mean sensible (wet bulb) | 21.5 |
| Monthly range | 63.0 |
| Highest mean daily | 48.3. 13th |
| Lowest mean daily | -0.7, 18th |
| Mean maximum | 31.7 |
| Mean minimum | 14.7 |
| Mean daily range | 17.0 |
| Greatest daily range | 29.5, 4th |
| Least daily range | 3.0, 9th |

### **Humidity.**

| | |
|---|---|
| Mean dew point | 18.6 |
| Mean force of vapor | .132 |
| Mean relative humidity | 87.1 |

### **Precipitation.** In inches.

| | |
|---|---|
| Total precipitation, in inches | 1.48 |
| Total snow, in inches | 4¾ |
| Number of days on which .01 inch or more rain fell | 12 |

Days of sleighing, none.

*Temperature in ground shelter.
**Reduced to freezing and sea-level.

### **Wind.**

| | |
|---|---|
| Total movement | 4022 m |
| Greatest daily movement | 477m, 25th |
| Least daily movement | 3m, 18th |
| Mean daily movement | 130m |
| Mean hourly velocity | 5.4 m |

Maximum pressure per square foot, 13.0 lbs 51m per hour, 25th, 10A, N.
Maximum velocity for 5 minutes, 36m per hour, 25th, 9A, N.
Prevailing direction, West Northwest.

Summary.

| | |
|---|---|
| North west | 23 per cent |
| West | 19 " " |
| West Northwest | 13 " " |
| North | 13 " " |
| North Northeast | 10 " " |
| Other directions | 22 " " |

### **Weather.**

Mean cloudiness observed . . . . 39 per cent
Total cloudiness recorded by the Sun Thermometer . . 163 hours = 57 per cent.

| | |
|---|---|
| Number of clear days | 5 |
| Number of fair days | 13 |
| Number of cloudy days | 13 |

### **Bright Sunshine.**

Number hours recorded, 120 hrs,= 43 per cent

**Rain,** 6th. 8th 9th, 12th, 13th, 14th.

**Snow,** 6th, 7th, 11th, 14th, 15th, 17th, 21st, 24th, 26th, 30th.

**Hail,** 12th.

**Gales,** 35 miles or more per hour: 50m, 10th, N.W.; 35m, 15th, W.: 51m, 25th. N.

# DAILY SUMMARY.

| Day. | Barometer Reduced to Sea Level. | | | Temperature. Ground Shelter. | | | | | | | No. Hours of Bright Sunshine |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Maximum | Minimum. | Mean. Semi-daily | Maximum | Time. | Minimum. | Time. | Mean of Max. and Min. | Mean Hourly Draper. | Mean Sensible Wet Bulb. | |
| 1 | 30.35 | 29.91 | 30.282 | 38 0 | 3 P | 30 0 | 8 A | 34.0 | 33.1 | 29.0 | 4.0 |
| 2 | 30.35 | 30.07 | 30.207 | 40.0 | 3 P | 25.0 | 12 P | 32.5 | 32.2 | 30.8 | 1.8 |
| 3 | 30.45 | 30.27 | 30.444 | 25.0 | 3 P | 11.0 | 12 P | 18.0 | 17.2 | 13.0 | 7.0 |
| 4 | 30 48 | 30.26 | 30.381 | 34.0 | 3 P | 4 5 | 7 A | 19.3 | 17.6 | 23.3 | 7.7 |
| 5 | 30.26 | 30.04 | 30.162 | 33.0 | 10 P | 13.0 | 2 A | 23.0 | 22.4 | 20.0 | 1.0 |
| 6 | 30.27 | 29.71 | 30.084 | 34.0 | 1:30 P | 20.0 | 7 A | 27.0 | 27.9 | 24.5 | 4.5 |
| 7 | 29.86 | 29.41 | 29.604 | 40.0 | 10 P | 31.0 | 3 A | 35.5 | 33.4 | 32 3 | 0.0 |
| 8 | 30.34 | 29.87 | 30.207 | 40.0 | 12 M | 33.0 | 12 P | 36.5 | 36.3 | 33.5 | 1.8 |
| 9 | 30.34 | 29.99 | 30.263 | 36.0 | 12 P | 33.0 | 0 A | 34 5 | 34.1 | 33.5 | 0 0 |
| 10 | 30.53 | 29 81 | 30.186 | 46.0 | 6 A | 19.0 | 12 P | 32 5 | 30.4 | 27.5 | 3.5 |
| 11 | 30.67 | 30.46 | 30.577 | 25.0 | 12 M | 16.0 | 7 A | 20.5 | 20.1 | 17 3 | 6.0 |
| 12 | 30.46 | 30.00 | 30.170 | 39.0 | 9 P | 22.0 | 0 A | 30 5 | 31.5 | 31.3 | 0.0 |
| 13 | 30.00 | 29.74 | 29.859 | 54.0 | 3 P | 39 0 | 0 A | 46.5 | 48.3 | 48.0 | 0.0 |
| 14 | 29.99 | 29 68 | 29.867 | 51.0 | 0 A | 22 0 | 11 P | 36.5 | 34.6 | 31.3 | 1.3 |
| 15 | 30.14 | 29.99 | 30.096 | 24.5 | 2 P | 13.0 | 12 P | 18.7 | 18.3 | 15.3 | 4.9 |
| 16 | 30.25 | 30.05 | 30.176 | 16.5 | 3 P | 8.0 | 8 A | 12.3 | 12.7 | 11.3 | 7.1 |
| 17 | 30.38 | 29.96 | 30.152 | 15 0 | 1 P | −4.0 | 12 P | 5.5 | 8.3 | 5.5 | 5.5 |
| 18 | 30.45 | 30.35 | 30.421 | 11.0 | 3 P | −9.0 | 7 A | 1.0 | −0.7 | −3.5 | 4.6 |
| 19 | 30 42 | 30.24 | 30.350 | 14.0 | 6 P | −7.0 | 7 A | 3 5 | 5.9 | 2.7 | 3.3 |
| 20 | 30.46 | 30.24 | 30.363 | 27.0 | 3 P | 8.0 | 7 A | 17.5 | 16 7 | 13.7 | 7.4 |
| 21 | 30.56 | 30 46 | 30.517 | 21.0 | 4 P | 9.0 | 3 A | 15.0 | 15.4 | 15.0 | 0.3 |
| 22 | 30.47 | 30.26 | 30 346 | 35.5 | 3 P | 13.5 | 0 A | 24.5 | 25.3 | 25.0 | 1.3 |
| 23 | 30.26 | 29.88 | 30 091 | 40.0 | 3 P | 14.0 | 7:30 A | 27.0 | 26.1 | 23.0 | 6.5 |
| 24 | 29 88 | 29.71 | 29.750 | 34.0 | 3 P | 26.0 | 7 A | 30.0 | 30.8 | 31.0 | 0.0 |
| 25 | 30.07 | 29 78 | 30.020 | 28.0 | 0 A | 9.0 | 12 P | 18 5 | 20.9 | 19.0 | 7.0 |
| 26 | 30.06 | 29.74 | 29 894 | 27.5 | 4 P | 1.5 | 6 A | 14.5 | 17.0 | 16 5 | 0.0 |
| 27 | 29 74 | 29.62 | 29.686 | 35.5 | 3 P | 26.0 | 0 A | 30 7 | 30.5 | 30.0 | 5.1 |
| 28 | 29.91 | 29.62 | 29 789 | 33.5 | 11 A | 13.0 | 12 P | 23.3 | 27.3 | 25 0 | 8.1 |
| 29 | 29 97 | 29.79 | 29 864 | 27.5 | 1 P | 3.0 | 6 A | 15.3 | 12 3 | 5.7 | 8.2 |
| 30 | 29.81 | 29.52 | 29.695 | 23.0 | 3 P | 2.5 | 1 A | 12.7 | 12.9 | 12.0 | 4.1 |
| 31 | 30.00 | 29.81 | 29.931 | 35.0 | 2 P | 11.0 | 1 A | 23.0 | 25.3 | 23.0 | 7.8 |

# DAILY SUMMARY.

| Day. | Humidity. | | | Wind. | | | | | | Precipitation. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | Total in Inches. | |
| | Mean Dew Point. | Mean Force vapor. | Mean Relative Humidit | Prevailing Direction. | Total Movement in Miles. | Maximum Pressure Per Square Ft | Miles per Hour. | Time. | Beginning. | Ending. | Rain.** | Snow. |
| 1 | 25.0 | .174 | 79.5 | W. | 353 | 4.0 | 28 | 1 A | | | | |
| 2 | 22.0 | .163 | 73.5 | W.S.W. | 154 | 2.0 | 20 | 11 P | | | | |
| 3 | 7.0 | .083 | 76.5 | N.N.W. | 164 | 1.0 | 14 | 1 A | | | | |
| 4 | 13.0 | .108 | 82.0 | W. | 16 | 0.0 | — | — | | | | |
| 5 | 16.0 | .119 | 80.5 | S.W. | 123 | 2.5 | 22 | 12 M | | | | |
| 6 | 23.0 | .138 | 94.0 | N.W. | 106 | 1.5 | 17 | 2 A | 6 P | 12 P | .16 | 1 |
| 7 | 28.5 | .196 | 81.5 | W.N.W. | 20 | 1.0 | 14 | 10 P | 0 A | 4 A | .16 | 1 |
| 8 | 31.5 | .195 | 90.0 | W.N.W. | 96 | 1.0 | 14 | 2 A | 7 P | 12 P | .18 | |
| 9 | 32.0 | .196 | 95.0 | N.W | 57 | 0.0 | — | — | 0 A | 10 P | .58 | |
| 10 | 24.5 | .170 | 82.0 | N. | 338 | 12.5 | 50 | 11 A | | | | |
| 11 | 13.5 | .103 | 80.5 | W. | 165 | 1.5 | 17 | 3 P | 7 P | 10 P | | T |
| 12 | 30.0 | .168 | 92.5 | S.W. | 51 | 2.0 | 20 | 12 P | 7 A | 11 P | .05 | |
| 13 | 47.0 | .353 | 93.0 | S.S.W. | 239 | 3.0 | 24 | 10 A | 0 A | 12 P | .04 | |
| 14 | 30.0 | .186 | 92.0 | W.N.W. | 180 | 3.0 | 24 | 1 P | 0 A | 4 P | .13 | T |
| 15 | 11.0 | .096 | 79.5 | W. | 245 | 6.0 | 35 | 8 P | 3 P | 5 P | .01 | T |
| 16 | 8.5 | .078 | 76.0 | W. | 215 | 4.5 | 30 | 2 P | | | | |
| 17 | 3.5 | .058 | 90.5 | N.W. | 131 | 5.5 | 33 | 5 P | 3 A | 6 A | .01 | ¼ |
| 18 | -6.0 | .039 | 86.5 | W.N.W. | 3 | 0.0 | — | — | | | | |
| 19 | -1.0 | .058 | 83.0 | N.W. | 18 | 0.0 | — | — | | | | |
| 20 | 9.5 | .089 | 77.5 | N.W. | 102 | 1.5 | 17 | 2 P | | | | |
| 21 | 14.0 | .090 | 95.0 | N.N.E. | 21 | 0.0 | — | — | 1 P | 3 P | .01 | ¼ |
| 22 | 23.5 | .140 | 94.0 | N.N.E. | 19 | 0.0 | — | — | | | | |
| 23 | 22.0 | .130 | 95.0 | N.N.E. | 36 | 0.0 | — | — | | | | |
| 24 | 30.0 | .173 | 97.5 | E. | 90 | 3.0 | 24 | 12 P | 6 P | 11:30 P | .12 | 1½ |
| 25 | 16.5 | .107 | 88.5 | N. | 477 | 13.0 | 51 | 10 A | | | | |
| 26 | 16.5 | .102 | 97.0 | W. | 112 | 2.5 | 22 | 8 P | 5:30 P | 7 P | T | T |
| 27 | 28.5 | .171 | 94.5 | S.S.W. | 122 | 0.5 | 10 | 3 P | | | | |
| 28 | 24.0 | .146 | 91.5 | N.W. | 175 | 1.5 | 17 | 12 M | | | | |
| 29 | 4.0 | .059 | 88.5 | N. | 62 | 0.0 | — | — | | | | |
| 30 | 9.5 | .081 | 87.0 | N. | 52 | 0.0 | — | — | 6 A | 1 P | .03 | ¾ |
| 31 | 20.5 | .133 | 87.0 | N.W. | 80 | 2.0 | 20 | 8 A | | | | |

**Rain or melted snow at base of tower.

* Included in following day.

# Annual Summary for 1919.

---

### **Pressure.** In inches.

| | |
|---|---|
| Maximum reduced to freezing, | 30.61, Mar. 15th, 8 A. |
| Minimum reduced to freezing, | 28.89, Mar. 28th, 12 M. |
| Maximum reduced to freezing and sea-level, | 30.92, Mar. 15th, 8 A. |
| Minimum reduced to freezing and sea-level, | 29.20, Mar. 28th, 12 M. |
| Mean semi-daily reduced to freezing and sea-level, | 30.034 |
| Annual range, | 1.72 |

### ***Air Temperature.** In degrees Fahr.

| | |
|---|---|
| Highest, | 101.0, June 3d, 4 P. |
| Lowest, | —9.0, Dec. 18th, 7 A. |
| Mean hourly, | 48.3 |
| Mean of means of max. and min., | 48.5 |
| Mean sensible (wet bulb), | 43.6 |
| Annual range, | 110.0 |
| Highest mean daily, | 85.4, July 5 |
| Lowest mean daily, | —0.7, Dec. 18 |
| Mean maximum, | 58.8 |
| Mean minimum, | 38.2 |
| Mean daily range, | 20.6 |
| Greatest daily range, | 43.5, June 13 |
| Least daily range, | 3.0, Dec. 9 |

### **Humidity.**

| | |
|---|---|
| Mean dew point, | 39.8 |
| Mean force of vapor, | .390 |
| Mean relative humidity, | 77.5 |

### **Wind.**

| | |
|---|---|
| Total movement, | 52.335 m |
| Greatest daily movement, | 580 m., Mar. 29 |
| Least daily movement, | 3 m., Dec. 18 |
| Mean daily movement, | 143 m |
| Mean hourly velocity, | 6.0 m |

Maximum pressure per square foot, 14.0 lbs., 53 m. per hour, Mar. 28, 10 P., N.W.

Maximum velocity for 5 minutes, 36 m. per hour, Jan. 11, 7 A. N.W.; Dec. 25, 9 A. N.

Prevailing direction, . . . . . . . . . . . West.

### Summary.

| | |
|---|---|
| South Southwest | 13 per cent |
| South | 14 " " |
| Northwest | 11 " " |
| North | 11 " " |
| Other directions, | 51 " " |

### **Precipitation.** In inches.

| | |
|---|---|
| Total precipitation, rain or melted snow, | 41.42 |
| Snow total in inches, | 24.50 |
| Number of days on which .01 or more rain or melted snow fell, | 132 |

### **Weather.**

| | |
|---|---|
| Mean cloudiness observed, | 48 per cent. |
| Total cloudiness recorded by Sun Thermometer, | 1831 hrs.=42 per cent. |
| Number of clear days, | 130 |
| Number of fair days, | 131 |
| Number of cloudy days, | 104 |

### **Bright Sunshine.**

Number of hours recorded, 2569 hrs.=58 per cent.

### **Dates of Frosts.**

| | |
|---|---|
| Last, | May 1th |
| First, | Sept. 18th |

### **Dates of Snow.**

| | |
|---|---|
| Last, | April 25th |
| First, | Nov. 5th |
| Total days of sleighing, | 23 |

### **Gales of 50 or More Miles Per Hour.**

Jan. 11th, 50m., N.W.; Mar. 28th, 53m., N.W.; Dec. 10th, 50m., N.W.; Dec. 25th, 51m., N.

Temperature in ground shelter.

J. E. OSTRANDER,
*Meteorologist.*

G. A. SMITH,
*Observer.*

BULLETIN No. 373. JANUARY, 1920

# Meteorological Observations
AT THE
# MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.
*Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.*
*Height of Wind Instruments 72 ft. Time used, 75th Mer.*

## MONTHLY SUMMARY.

### Pressure. In inches.

| | |
|---|---|
| Maximum reduced to freezing | 30.64, 31st, 9 A |
| Minimum reduced to freezing | 29.09, 17th, 1 P |
| Reduced maximum reading | 30.99, 31st, 12 P |
| Reduced minimum reading | 29.41, 17th, 1 P |
| Mean semi-daily reduced | 30.174 |
| Monthly range | 1.58 |

### *Air Temperature. In Degrees Fahr.

| | |
|---|---|
| Highest | 4.10, 27th, 4 P |
| Lowest | -16.5, 20th, 8 A |
| Mean hourly | 16.0 |
| Mean of means of max. and min. | 15.2 |
| Mean sensible (wet bulb) | 13.6 |
| Monthly range | 57.5 |
| Highest mean daily | 35.9. 8th |
| Lowest mean daily | -4.7, 31st |
| Mean maximum | 24.9 |
| Mean minimum | 5.5 |
| Mean daily range | 19.4 |
| Greatest daily range | 30.0, 20th, 27th |
| Least daily range | 7.5, 8th |

### Humidity.

| | |
|---|---|
| Mean dew point | 11.4 |
| Mean force of vapor | .095 |
| Mean relative humidity | 87.7 |

### Precipitation. In inches.

| | |
|---|---|
| Total precipitation, in inches | 2.74 |
| Total snow, in inches | 23¼ |
| Number of days on which .01 inch or more rain fell | 13 |

Days of sleighing, 23.

*Temperature in ground shelter.
**Reduced to freezing and sea-level.

### Wind.

| | |
|---|---|
| Total movement | 4734 m |
| Greatest daily movement | 357m, 14th |
| Least daily movement | 41m, 27th |
| Mean daily movement | 153m |
| Mean hourly velocity | 6.4 m |

Maximum pressure per square foot, 9.5 lbs = 43m per hour, 18th, 12M, N.W.

Maximum velocity for 5 minutes, 30m per hour, 25th, 9A, N.

Prevailing direction, Northwest.

Summary.

| | |
|---|---|
| North Northwest | 26 per cent |
| North | 16 " " |
| Northwest | 13 " " |
| West Northwest | 13 " " |
| South Southwest | 10 " " |
| Other directions | 22 " " |

### Weather.

| | |
|---|---|
| Mean cloudiness observed | 49 per cent |
| Total cloudiness recorded by the Sun Thermometer . . 80 hours = | 27 per cent. |
| Number of clear days | 12 |
| Number of fair days | 15 |
| Number of cloudy days | 4 |

### Bright Sunshine.

Number hours recorded, 214 hrs, = 73 per cent

**Rain.** 1st. 8th, 9th, 23rd.

**Snow.** 8th, 9th, 13th, 14th, 16th, 17th, 19th, 20th, 23rd, 24th, 25th, 27th, 28th.

**Hail,** 7th.

**Gales.** 35m 12th, W.; 36m, 14th, W. N. W.; 35m, 17th, N.W.; 43m, 18th. N.W.

# DAILY SUMMARY.

| Day. | Barometer Reduced to Sea Level. |  |  | Temperature. Ground Shelter. |  |  |  |  |  |  | No. Hours of Bright Sunshine |
|---|---|---|---|---|---|---|---|---|---|---|---|
|  | Maximum | Minimum. | Mean. Semi-daily | Maximum | Time. | Minimum. | Time. | Mean of Max. and Min. | Mean Hourly Draper. | Mean Sensible Wet Bulb. |  |
| 1 | 29.81 | 29.45 | 29.603 | 37.0 | 4 P | 23.0 | 12 P | 30.0 | 29.3 | 26.5 | 1.7 |
| 2 | 29.88 | 29.72 | 29.863 | 18.0 | 3 P | 9.0 | 8 A | 13.5 | 13.5 | 8.5 | 7.8 |
| 3 | 30.12 | 29.88 | 30.052 | 18.5 | 3 P | 8.0 | 12 P | 13.3 | 10.8 | 9.0 | 8.0 |
| 4 | 30.35 | 30.12 | 30.263 | 18.0 | 4 P | -1.0 | 9 A | 8.5 | 7.6 | 4.5 | 8.2 |
| 5 | 30.43 | 30.29 | 30.395 | 22.5 | 4 P | 0.0 | 3 A | 11.3 | 9.3 | 7.5 | 8.8 |
| 6 | 30.35 | 30.27 | 30.329 | 35.0 | 3:30 P | 9.0 | 0 A | 22.0 | 22.2 | 19.5 | 8.2 |
| 7 | 30.34 | 30.12 | 30.241 | 36.5 | 5 P | 25.0 | 7 A | 30.8 | 31.8 | 30.0 | 4.9 |
| 8 | 30.13 | 29.98 | 30.072 | 38.5 | 2 P | 31.0 | 7 A | 34.8 | 35.9 | 34.5 | 4.6 |
| 9 | 30.04 | 29.77 | 29.909 | 36.0 | 1 A | 24.0 | 12 P | 30.0 | 29.9 | 29.0 | 3.3 |
| 10 | 30.33 | 30.04 | 30.255 | 31.0 | 3 P | 9.0 | 12 P | 20.0 | 20.7 | 16.3 | 8.0 |
| 11 | 30.27 | 29.86 | 30.056 | 27.5 | 4 P | 5.5 | 3 A | 16.5 | 18.5 | 18.3 | 6.1 |
| 12 | 30.07 | 29.84 | 29.968 | 26.5 | 9 A | 4.0 | 12 P | 15.3 | 19.0 | 16.5 | 7.8 |
| 13 | 30.01 | 29.51 | 29.677 | 30.0 | 7 P | 4.0 | 0 A | 17.0 | 18.7 | 20.7 | 7.2 |
| 14 | 29.80 | 29.55 | 29.678 | 20.5 | 12 M | 1.0 | 12 P | 10.7 | 13.3 | 11.5 | 8.7 |
| 15 | 30.01 | 29.80 | 29.902 | 17.0 | 4 P | -3.5 | 12 P | 6.7 | 5.1 | 2.7 | 8.8 |
| 16 | 30.17 | 29.93 | 30.099 | 12.0 | 4 P | -14.0 | 5 A | -1.0 | -0.2 | -2.0 | 8.0 |
| 17 | 29.93 | 29.41 | 29.563 | 24.5 | 3:30 P | 7.0 | 0 A | 15.7 | 14.6 | 12.8 | 6.7 |
| 18 | 30.08 | 29.55 | 29.823 | 14.0 | 9 A | 2.0 | 12 P | 8.0 | 8.8 | 9.3 | 7.3 |
| 19 | 30.21 | 30.02 | 30.133 | 12.0 | 2 P | -3.0 | 4:30 A | 4.5 | 5.0 | 4.5 | 7.3 |
| 20 | 30.55 | 30.20 | 30.429 | 13.5 | 4 P | -16.5 | 8 A | -1.5 | 3.4 | -2.8 | 7.0 |
| 21 | 30.54 | 29.96 | 30.231 | 29.5 | 12 M | 10.0 | 12 P | 19.8 | 17.9 | 13.8 | 6.3 |
| 22 | 30.68 | 30.54 | 30.634 | 25.0 | 2 P | -3.5 | 7 A | 10.3 | 12.1 | 8.8 | 8.3 |
| 23 | 30.54 | 30.27 | 30.385 | 31.0 | 3 P | 18.0 | 0 A | 24.5 | 23.8 | 23.0 | 6.0 |
| 24 | 30.39 | 30.27 | 30.399 | 25.5 | 11 A | 17.0 | 12 P | 21.3 | 22.1 | 21.0 | 2.2 |
| 25 | 30.75 | 30.36 | 30.604 | 23.5 | 2 P | -1.5 | 12 P | 11.0 | 13.5 | 8.3 | 7.5 |
| 26 | 30.89 | 30.47 | 30.757 | 15.5 | 3:30 P | -8.0 | 9 A | 3.7 | 3.8 | 1.0 | 7.5 |
| 27 | 30.47 | 30.07 | 30.269 | 41.0 | 4 P | 11.0 | 0 A | 26.0 | 27.9 | 27.5 | 7.2 |
| 28 | 30.48 | 30.17 | 30.275 | 36.5 | 0 A | 7.5 | 12 P | 22.0 | 26.3 | 23.7 | 6.4 |
| 29 | 30.65 | 30.23 | 30.515 | 19.0 | 12 P | -2.0 | 8 A | 8.5 | 11.5 | 7.5 | 7.2 |
| 30 | 30.41 | 29.96 | 30.115 | 37.0 | 2:30 P | 10.5 | 12 P | 23.7 | 25.4 | 21.7 | 7.0 |
| 31 | 30.99 | 30.41 | 30.903 | 1.0 | 4 P | -11.5 | 7 A | -5.3 | -4.7 | -10.5 | 9.5 |

## DAILY SUMMARY.

| Day. | Humidity. |  |  | Wind. |  |  |  |  | Precipitation. |  |  |  |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
|  |  |  |  |  |  |  |  |  |  |  | Total in Inches. |  |
|  | Mean Dew Point. | Mean Force vapor. | Mean Relative Humidit | Prevailing Direction. | Total Movement in Miles. | Maximum Pressure Per Square Ft | Miles per Hour. | Time. | Beginning. | Ending. | Rain.** | Snow. |
| 1 | 25.0 | .149 | 91.5 | N.W. | 126 | 4.0 | 28 | 10 P | 9 A | 11 A | .01 |  |
| 2 | 4.5 | .070 | 79.5 | W. | 240 | 4.5 | 30 | 5 A |  |  |  |  |
| 3 | 5.0 | .068 | 85.0 | W.N.W. | 298 | 3.0 | 24 | 8 A |  |  |  |  |
| 4 | 0.0 | .054 | 82.5 | N.W | 129 | 0.5 | 10 | 8 P |  |  |  |  |
| 5 | 3.5 | .065 | 84.0 | N.N.E. | 208 | 2.5 | 22 | 8 A |  |  |  |  |
| 6 | 16.5 | .113 | 89.5 | N. | 72 | 0.0 | — | — |  |  |  |  |
| 7 | 37.5 | .171 | 92.5 | S.S.W. | 133 | 1.5 | 17 | 6 P | 9 P | 11 P | T |  |
| 8 | 33.0 | .196 | 95.5 | S. | 97 | 0.0 | — | — | 10 A | 5 P | T | T |
| 9 | 29.5 | .160 | 100.0 | N. | 78 | 0.0 | — | — | 2 A | 11 P | .85 | 6 |
| 10 | 14.0 | .098 | 88.0 | N.N.W. | 113 | 0.5 | 10 | 2 P |  |  |  |  |
| 11 | 16.0 | .107 | 88.5 | S.S.W. | 53 | 0.0 | — | — |  |  |  |  |
| 12 | 13.5 | .103 | 84.0 | W. | 236 | 6.0 | 35 | 8 A |  |  |  |  |
| 13 | 20.0 | .119 | 97.5 | S.S.W. | 73 | 5.5 | 33 | 10 P | 2 A | 12 P | .17 | 1¾ |
| 14 | 8.0 | .080 | 81.5 | W.N.W. | 357 | 6.5 | 36 | 12 M | 0 A | 2 A | .02 | T |
| 15 | −1.5 | .053 | 79.5 | N.N.W. | 172 | 1.5 | 17 | 2 P |  |  |  |  |
| 16 | −6.5 | .047 | 79.0 | N.W. | 84 | 1.0 | 14 | 12 M | 8 P | 12 P | .20 | 2 |
| 17 | 12.0 | .082 | 96.0 | N.N.W. | 188 | 6.0 | 35 | 5 P | 0 A | 6 P | .28 | 3 |
| 18 | 6.5 | .073 | 84.5 | W.N.W. | 273 | 9.5 | 43 | 12 M |  |  |  |  |
| 19 | 2.5 | .057 | 90.5 | W.S.W. | 167 | 0.5 | 10 | 2 P | 3 P | 8 P | .12 | 1½ |
| 20 | −5.0 | .023 | 88.5 | N.N.W. | 68 | 0.0 | — | — | 7 P | 11 P | .08 | ½ |
| 21 | 11.0 | .085 | 87.5 | N.W. | 120 | 3.0 | 24 | 12 M |  |  |  |  |
| 22 | 6.5 | .072 | 87.0 | N. | 76 | 0.0 | — | — |  |  |  |  |
| 23 | 22.0 | .127 | 96.5 | N.N.W. | 64 | 0.0 | — | — | 0 A | 12 P | .54 | 2½ |
| 24 | 20.0 | .117 | 94.0 | N. | 175 | 1.5 | 17 | 10 A | 0 A | 12 P | .34 | 3 |
| 25 | 6.0 | .072 | 86.5 | N.N.W. | 182 | 1.5 | 17 | 11 A |  |  |  |  |
| 26 | −1.5 | .051 | 86.0 | N.N.W. | 95 | 0.0 | — | — | 4 A | 6 A | .02 | T |
| 27 | 25.5 | .163 | 89.5 | N.N.W. | 41 | 0.0 | — | — | 5 A | 10 A | .08 | 1 |
| 28 | 21.5 | .141 | 89.5 | N.N.E. | 76 | 2.0 | 20 | 5 P |  |  |  |  |
| 29 | 4.0 | .070 | 83.0 | W.N.W. | 102 | 0.5 | 10 | 6 A |  |  |  |  |
| 30 | 19.0 | .126 | 83.5 | W.S.W. | 285 | 3.5 | 26 | 4 A |  |  |  |  |
| 31 | −14.0 | .029 | 78.5 | N. | 353 | 3.5 | 26 | 9 A |  |  |  |  |

**Rain or melted snow at base of tower. * Included in following day.

# REMARKS

The most marked characteristics of the weather during the month were the low temperature and large amount of sunshine. To these was added a rather large snowfall with practically no thawing weather. The thermometer registered below zero on ten different days and the maximum temperature was above freezing on only eight days. Much of the snowfall occurred during the night and only four days were cloudy. Sleighing began on the ninth and continued for the rest of the month. The month closed with much snow on the ground and good sleighing on most of the roads.

The mean barometer was unusually high and the changes in pressure were unusually large. The maximum pressure was registered at midnight of the last day of the month and was the highest record ever made at this station. The range of pressure was practically the normal for January. The total wind movement was nearly normal and more than two-thirds was from the northwest quadrant.

The mean temperature was more than nine degrees below the normal, making it one of our coldest months. It was, however, 2.7 degrees warmer than the record of January, 1918. The maximum temperature was the same as for January, 1896, which was our lowest maximum record for any month. The minimum temperature was nearly ten degrees lower than the average value for this record.

The mean relative humidity was very high and the mean dew point was about six degrees lower than the normal.

The total precipitation was about three-fourths of the normal and practically all of it was snow.

J. E. OSTRANDER, Meteorologist.

G. S. SMITH, Observer.

BULLETIN No. 374. FEBRUARY, 1920

# Meteorological Observations
AT THE
# MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.
*Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.*
*Height of Wind Instruments 72 ft. Time used, 75th Mer.*

## MONTHLY SUMMARY.

**Pressure.** In inches.

| | |
|---|---|
| Maximum reduced to freezing, | 30.71, 1st, 10 A |
| Minimum reduced to freezing, | 28.89, 15th, 11 A |
| Reduced maximum reading | 31.05, 1st, 10 A |
| Reduced minimum reading, | 29.21, 15th, 11 A |
| Mean semi-daily reduced | 29.983 |
| Monthly range | 1.84 |

***Air Temperature.** In Degrees Fahr.

| | |
|---|---|
| Highest | 45.0, 18th, 2.30 P |
| Lowest | -18.0, 1st, 7 A |
| Mean hourly | 21.3 |
| Mean of means of max. and min. | 21.3 |
| Mean sensible (wet bulb) | 18.0 |
| Monthly range | 63.0 |
| Highest mean daily | 35.5. 18th |
| Lowest mean daily | -0.9, 1st |
| Mean maximum | 30.9 |
| Mean minimum | 11.7 |
| Mean daily range | 19.2 |
| Greatest daily range | 35.5, 28th |
| Least daily range | 3.5, 26th |

**Humidity.**

| | |
|---|---|
| Mean dew point | 14.3 |
| Mean force of vapor | .116 |
| Mean relative humidity | 82.9 |

**Precipitation.** In inches.

| | |
|---|---|
| Total precipitation, in inches | 4.45 |
| Total snow, in inches | 31.0 |
| Number of days on which .01 inch or more rain fell | 15 |

Days of sleighing, 29.

**Wind.**

| | |
|---|---|
| Total movement | 4791 m |
| Greatest daily movement | 450m, 16th |
| Least daily movement | 5m, 10th |
| Mean daily movement | 165m |
| Mean hourly velocity | 5. 7m |

Maximum pressure per square foot, 12.0 lbs = 49m per hour, 15th, 1P, W.N.W.

Maximum velocity for 5 minutes, 30m per hour, 27th, 4P, W.N.W.

Prevailing direction, West Northwest.

Summary.

| | |
|---|---|
| North | 17 per cent |
| Northwest | 17 " " |
| West Northwest | 14 " " |
| South Southwest | 14 " " |
| West Southwest | 10 " " |
| Other directions | 28 " " |

**Weather.**

| | |
|---|---|
| Mean cloudiness observed | 52 per cent |
| Total cloudiness recorded by the Sun Thermometer | 82 hours = 28 per cent. |
| Number of clear days | 11 |
| Number of fair days | 16 |
| Number of cloudy days | 2 |

**Bright Sunshine.**

Number hours recorded, 214 hrs, = 72 per cent.

**Rain.** 6th. 10th, 15th, .

**Snow,** 1st, 5th, 6th, 7th, 10th, 12th, 13th, 15th, 19th, 21st, 22d, 23d, 24th, 25th, 28th, 29th.

**Hail,** 6th.

**Gales,** 49m 15th, W.N.W.; 35m 27th, W. N. W.

---

*Temperature in ground shelter.

**Reduced to freezing and sea-level.

# DAILY SUMMARY.

| Day. | Barometer Reduced to Sea Level. Maximum | Minimum. | Mean. Semi-daily | Temperature. Ground Shelter. Maximum | Time. | Minimum. | Time. | Mean of Max. and Min. | Mean Hourly Draper. | Mean Sensible Wet Bulb. | No. Hours of Bright Sunshine |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 31.05 | 30.73 | 30.938 | 14.0 | 4 P | −18.0 | 7 A | −2.0 | −0.9 | −3 5 | 7.8 |
| 2 | 30.73 | 30.44 | 30.537 | 38 0 | 3 P | 9.0 | 0 A | 23.5 | 24.3 | 21.3 | 7.0 |
| 3 | 30.66 | 30.43 | 30.496 | 37.0 | 2:30 P | 24.0 | 8 A | 30.5 | 30.0 | 26.3 | 6.2 |
| 4 | 30.77 | 30.65 | 30.740 | 27.5 | 3 P | 17.0 | 8 A | 22.3 | 22.6 | 18.7 | 5.7 |
| 5 | 30.67 | 29.89 | 30.369 | 29.0 | 12 P | 19.0 | 7 A | 24.0 | 23.0 | 21.5 | 1.3 |
| 6 | 29.89 | 29.32 | 29.484 | 34.0 | 1 P | 26 0 | 11 P | 30.0 | 31.1 | 30.7 | 5.8 |
| 7 | 29.69 | 29.29 | 29.479 | 37.0 | 3:30 P | 26 0 | 12 P | 31.5 | 29.9 | 27.0 | 8.6 |
| 8 | 30.01 | 29.69 | 29.899 | 34.5 | 3 P | 21.5 | 6:30 A | 28.0 | 25.2 | 22.3 | 9.3 |
| 9 | 30.16 | 30.01 | 30.151 | 34.0 | 3 P | 8.0 | 12 P | 21.0 | 19.1 | 20.3 | 9 0 |
| 10 | 30.14 | 29.76 | 29.889 | 18.5 | 6:30 P | 1 0 | 6 A | 9.7 | 10.9 | 10.7 | 1.5 |
| 11 | 29.99 | 29 81 | 29.945 | 34.5 | 1 P | 3.0 | 5:30 A | 18.7 | 16 3 | 10.3 | 9.3 |
| 12 | 30.09 | 29.98 | 30.058 | 28.0 | 3 P | 3.5 | 5:30 A | 15.7 | 19.2 | 18.3 | 7.5 |
| 13 | 30.04 | 29.65 | 29.836 | 34.0 | 6 P | 21.5 | 3 A | 27 7 | 27.5 | 27.0 | 4.4 |
| 14 | 30.09 | 29.81 | 29.959 | 43.0 | 3:30 P | 20.0 | 7 A | 31.5 | 30.5 | 26.7 | 9.1 |
| 15 | 29.81 | 29.21 | 29.345 | 36.0 | 7 A | 10.0 | 12 P | 23.0 | 23.2 | 22.0 | 4.6 |
| 16 | 29.88 | 29 57 | 29.744 | 16.5 | 1 P | 4.0 | 12 P | 10.3 | 9.5 | 7.5 | 8 7 |
| 17 | 29.89 | 29.73 | 29 822 | 30.0 | 12 P | 0.0 | 2:30 A | 15.0 | 18.1 | 19.0 | 7.0 |
| 18 | 29.79 | 29.73 | 29.779 | 45.0 | 2:30 P | 28.0 | 2 A | 36.5 | 35.5 | 33.3 | 8.5 |
| 19 | 29.78 | 29.39 | 29.536 | 36.0 | 0 A | 14.0 | 12 P | 25.0 | 26.4 | 23.5 | 6.2 |
| 20 | 30.34 | 29.78 | 30.138 | 27.5 | 4 P | 8.0 | 5 A | 17.7 | 18.5 | 16.7 | 10.1 |
| 21 | 30.57 | 30.32 | 30.489 | 33.5 | 11:30 A | 9 0 | 7 A | 21.3 | 21.3 | 16.3 | 9.1 |
| 22 | 30.37 | 30.10 | 30.152 | 39.0 | 1:30 P | 16.0 | 12 P | 27.5 | 26.7 | 13.0 | 7.8 |
| 23 | 30.40 | 29.84 | 29 993 | 34.0 | 11 A | 12 0 | 5 P | 23.0 | 25.1 | 21.7 | 6.2 |
| 24 | 29.84 | 29.51 | 29.647 | 34.0 | 1:30 P | 26.0 | 0 A | 30.0 | 29.7 | 18.0 | 5.6 |
| 25 | 29.51 | 29.26 | 29.340 | 32.0 | 12 M | 17.0 | 12 P | 24.5 | 24 4 | 16.5 | 8.6 |
| 26 | 29.79 | 29.42 | 29.546 | 19.5 | 1:30 P | 16.0 | 12 P | 17.7 | 13.7 | 10.3 | 10.1 |
| 27 | 30.20 | 29.79 | 30.041 | 13.0 | 1 P | −4.0 | 5 A | 4 5 | 5.0 | 4.0 | 10.2 |
| 28 | 30.33 | 30.02 | 30.210 | 23.5 | 1 P | −12.0 | 7 A | 5.7 | 8.3 | 4 3 | 8.3 |
| 29 | 30.02 | 29.87 | 29 937 | 35.0 | 3 P | 13.0 | 6 A | 24.0 | 23.3 | 19.5 | 10.6 |

# DAILY SUMMARY.

| Day. | Humidity. | | | Wind. | | | | | Precipitation. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Mean Dew Point. | Mean Force vapor. | Mean Relative Humidit | Prevailing Direction. | Total Movement in Miles. | Maximum Pressure Per Square Ft | Miles per Hour. | Time. | Beginning. | Ending. | Total in Inches. | |
| | | | | | | | | | | | Rain.** | Snow. |
| 1 | −16.5 | .044 | 77.0 | N.W. | 107 | 0.5 | 10 | 0 A | 8 P | 10 P | .01 | T |
| 2 | 18.0 | .147 | 79.0 | S.S.W. | 79 | 1.0 | 14 | 1:30 P | | | | |
| 3 | 23.0 | .158 | 80.5 | N. | 150 | 1.5 | 17 | 9 P | | | | |
| 4 | 15.5 | .109 | 82.0 | N E. | 288 | 3.0 | 24 | 2 P | | | | |
| 5 | 21.5 | .118 | 100.0 | N.N.E. | 359 | 3.0 | 24 | 8 P | 3 A | 12 P | 1.75 | 12 |
| 6 | 30.0 | .172 | 97.5 | N. | 395 | 3.0 | 24 | 1 P | 0 A | 12 P | .62 | 3 |
| 7 | 23.5 | .155 | 83.5 | N.N.W. | 183 | 5.0 | 32 | 12 M | 0 A | 2 A | .08 | 1 |
| 8 | 19.5 | .128 | 84.0 | N.W | 24 | 2.0 | 20 | 0:30 P | | | | |
| 9 | 17.0 | .119 | 83.0 | N.W. | 10 | 0.0 | — | — | | | | |
| 10 | 10.0 | .076 | 95.5 | W.S.W. | 5 | 0.0 | — | — | 5 A | 5 P | .22 | 1½ |
| 11 | 5.5 | .077 | 76.0 | W. | 8 | 0.5 | 10 | 3 P | | | | |
| 12 | 14.0 | .111 | 79.5 | W.N.W. | 7 | 0.0 | — | — | 7 P | 8 P | .02 | T |
| 13 | 25.5 | .150 | 94.5 | N. | 20 | 1.5 | 17 | 6 P | 9 A | 8 P | .21 | 2 |
| 14 | 23.0 | .163 | 79.5 | S.S.W. | 13 | 1.0 | 14 | 4:30 P | | | | |
| 15 | 20.0 | .131 | 90.5 | W. | 271 | 12.0 | 49 | 1 P | 5 A | 4 P | .57 | 3 |
| 16 | 4.0 | .067 | 81.0 | W.N.W. | 450 | 4.5 | 30 | 10 A | | | | |
| 17 | 16.0 | .115 | 86.0 | S.W. | 263 | 3.0 | 24 | 6 P | | | | |
| 18 | 30.0 | .206 | 79.5 | S.S.W. | 176 | 2.0 | 20 | 1 A | | | | |
| 19 | 21.5 | .136 | 88.5 | N.N.W. | 225 | 3.5 | 26 | 12 M | 5 A | 3 P | .22 | 2½ |
| 20 | 12.0 | .103 | 75.0 | N.W. | 214 | 2.0 | 20 | 12 M | | | | |
| 21 | 12.0 | .100 | 78.5 | W.S.W. | 102 | 0.5 | 10 | 8 P | 8 P | 12 P | .26 | 2 |
| 22 | 8.5 | .140 | 75.5 | N. | 140 | 1.0 | 14 | 1:30 P | 0 A | 3 A | .18 | 1½ |
| 23 | 18.0 | .126 | 82.5 | E.S.E. | 83 | 0.0 | — | — | 5 P | 12 P | .12 | 1 |
| 24 | 17.5 | .104 | 94.0 | N. | 86 | 0.0 | — | — | 0 A | 12 P | .13 | 1 |
| 25 | 12.0 | .100 | 77.5 | N.W. | 287 | 2.0 | 20 | 1 P | 0 A | 3 A | .02 | T |
| 26 | 6.0 | .076 | 77.5 | W.N.W. | 353 | 3.5 | 26 | 7 P | | | | |
| 27 | −1.0 | .058 | 76.0 | W.N.W | 306 | 6.0 | 35 | 5 P | | | | |
| 28 | −1.5 | .065 | 76.0 | S.S.W. | 119 | 1.5 | 17 | 12 M | 6 P | 12 P | .04 | ½ |
| 29 | 15.0 | .115 | 75.5 | W.S.W. | 68 | 0.5 | 10 | 8 P | 0 A | 3 A | T | T |

**Rain or melted snow at base of tower.

* Included in following day.

## REMARKS

The weather during February was exceptional in many ways. The barometer, which had reached the unprecedented height of 30.99 inches at midnight on the last day of the previous month, continued to rise until 10 A. M. on the first, when 31.05 inches was recorded, making a new high record for pressure at this station. The changes in pressure during the month were generally large and some were rather rapid. The total range of pressure for the month nearly equalled the normal range for an entire year. The marked barometric activity was not appreciably reflected in the total wind movement of the month.

The snowfall was by far the most noticeable feature of the month. The large amount of snow which had accumulated during January, owing to the absence of any appreciable thaw during that month, was augmented by a very large snowfall during February. A single storm early in the month was one of the most severe in recent years. This was followed by several storms of moderate amounts throughout the month, so that the total exceeded two and one-half feet. With practically no thawing weather during the month the accumulated snowfall of two months was practically all on the ground when the month closed. Although more or less settlement had taken place the ground was covered with from two and one-half to three and one-half feet.

Another feature of interest was the temperature. While the mean for the month was only about three degrees lower than the normal, the temperature was above freezing but little of the time. The temperature dropped to eighteen degrees below zero on the first and the mean hourly for that day was below zero. Near the end of the month very low temperatures were again noted. With the advent of warmer weather during the coming month swollen rivers and streams and damage from high water seems inevitable.

J. E. OSTRANDER, Meteorologist.

G. S. SMITH, Observer.

**BULLETIN No. 375. MARCH, 1920**

# Meteorological Observations
AT THE
# MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.
*Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.*
*Height of Wind Instruments 72 ft. Time used, 75th Mer.*

## MONTHLY SUMMARY.

**Pressure.** In inches.

| | |
|---|---|
| Maximum reduced to freezing | 30.24, 4th, 9 A |
| Minimum reduced to freezing | 28.72, 13th, 5 P |
| Reduced maximum reading | 30.55, 4th, 9 A |
| Reduced minimum reading | 29.03, 13th, 5 P |
| Mean semi-daily reduced | 29.972 |
| Monthly range | 1.52 |

***Air Temperature.** In Degrees Fahr.

| | |
|---|---|
| Highest | 70.5, 25th, 3.30 P |
| Lowest | -1.0, 2d, 7:30 A |
| Mean hourly | 34.0 |
| Mean of means of max. and min. | 34.3 |
| Mean sensible (wet bulb) | 30.5 |
| Monthly range | 71.5 |
| Highest mean daily | 47.1. 28th |
| Lowest mean daily | 14.5, 2d |
| Mean maximum | 45.4 |
| Mean minimum | 23.2 |
| Mean daily range | 22.2 |
| Greatest daily range | 43.5, 25th |
| Least daily range | 4.0, 5th |

**Humidity.**

| | |
|---|---|
| Mean dew point | 26.6 |
| Mean force of vapor | .202 |
| Mean relative humidity | 78.2 |

**Precipitation.** In inches.

| | |
|---|---|
| Total precipitation, in inches | 2.90 |
| Total snow, in inches | 5.75 |
| Number of days on which .01 inch or more rain fell | 11 |

Days of sleighing, 22.

**Wind.**

| | |
|---|---|
| Total movement | 6263 m |
| Greatest daily movement | 537m, 6th |
| Least daily movement | 54m, 11th |
| Mean daily movement | 202m |
| Mean hourly velocity | 8.4m |

Maximum pressure per square foot, 16.0 lbs= 57m per hour, 6th, 10:30 A, N.W.

Maximum velocity for 5 minutes, 36m per hour, 6th, 11 A, N.W.

Prevailing direction, West.

Summary.

| | |
|---|---|
| West | 19 per cent |
| West Northwest | 16 " " |
| South Southwest | 16 " " |
| West Southwest | 13 " " |
| Northwest | 13 " " |
| Other directions | 23 " " |

**Weather.**

| | |
|---|---|
| Mean cloudiness observed | 41 per cent |
| Total cloudiness recorded by the Sun Thermometer | 129 hours = 35 per cent. |
| Number of clear days | 16 |
| Number of fair days | 10 |
| Number of cloudy days | 5 |

**Bright Sunshine.**

Number hours recorded, 242 hrs, = 65 per cent.

**Rain.** 5th. 11th, 12th, 13th, 17th, 26th, 27th, 29th, 30th, 31st.

**Snow.** 19th, 20th.

**Gales.** 57m 6th, N.W.; 36m, 7th, W.; 40m, 14th, W. N. W.; 36m, 17th, W.N. W.; 35m, 18th, N.W.

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*Temperature in ground shelter.

**Reduced to freezing and sea-level.

# DAILY SUMMARY.

| Day. | Barometer Reduced to Sea Level. | | | Temperature. Ground Shelter. | | | | | | | No. Hours of Bright Sunshine |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Maximum | Minimum. | Mean. Semi-daily | Maximum | Time. | Minimum. | Time. | Mean of Max. and Min. | Mean Hourly Draper. | Mean Sensible Wet Bulb. | |
| 1 | 29.97 | 29.63 | 29.775 | 37.0 | 2:30 P | 6.0 | 7:30 A | 21.5 | 21.2 | 14.0 | 10.4 |
| 2 | 30 38 | 29 97 | 30.302 | 29.0 | 4 P | −1.0 | 7:30 A | 14.0 | 14.5 | 8.5 | 10.5 |
| 3 | 30.51 | 30.38 | 30.497 | 44 0 | 3 P | 8 0 | 7:30 A | 26 0 | 26.3 | 20 3 | 6.7 |
| 4 | 30.55 | 30.21 | 30 429 | 46.0 | 2:30 P | 24.5 | 6 A | 35.7 | 35.3 | 33.3 | 7.5 |
| 5 | 30.21 | 29.40 | 29 726 | 44.0 | 4 P | 40.0 | 0 A | 42.0 | 42.0 | 41.5 | 6.0 |
| 6 | 29 77 | 29.17 | 29 433 | 42 0 | 0 A | 11 0 | 12 P | 26.5 | 20 1 | 16.3 | 7.6 |
| 7 | 30.21 | 29.77 | 30 070 | 24.5 | 5:30 P | 6.0 | 8 A | 15 3 | 14.6 | 11.0 | 11.0 |
| 8 | 30.34 | 30 20 | 30.281 | 28 0 | 3 P | 4 5 | 6 A | 16.3 | 16.4 | 12.3 | 10 0 |
| 9 | 30 28 | 30.21 | 30 245 | 38.0 | 10:30 A | 14 5 | 4 A | 26.3 | 27.2 | 26.7 | 10.1 |
| 10 | 30.28 | 30.13 | 30.189 | 46.5 | 3 P | 30.0 | 1 A | 38.3 | 37.2 | 33.5 | 9.5 |
| 11 | 30.31 | 30.12 | 30 204 | 42 0 | 7 P | 24.0 | 5:30 A | 33.0 | 34.5 | 33.5 | 4.3 |
| 12 | 30 12 | 29 53 | 29.686 | 45.0 | 7 P | 35 0 | 4 A | 40.0 | 40.9 | 41.3 | 0.0 |
| 13 | 29.58 | 29 03 | 29 274 | 43.0 | 0 A | 21 0 | 12 P | 32.0 | 35 4 | 27.7 | 0.0 |
| 14 | 30.01 | 29.30 | 29.741 | 24 5 | 6 P | 17.0 | 7 A | 20 7 | 20.7 | 18.7 | 7.0 |
| 15 | 30.26 | 30.01 | 30.188 | 42.0 | 3 P | 15.0 | 6:30 A | 28 5 | 29.8 | 28.3 | 10.0 |
| 16 | 30.15 | 29.65 | 29.897 | 44.0 | 2:30 P | 31.0 | 0 A | 37.5 | 37 9 | 38.3 | 5.0 |
| 17 | 30.01 | 29.63 | 29.862 | 42 0 | 2:30 P | 30.0 | 12 P | 36 0 | 37 6 | 33.5 | 7.2 |
| 18 | 30.17 | 30 01 | 30.120 | 38.0 | 0:30 P | 19.0 | 12 P | 28 5 | 29 5 | 27.0 | 11.5 |
| 19 | 30.17 | 29 66 | 29 912 | 34.5 | 3 P | 15.5 | 2-30 A | 25 0 | 26.6 | 24 3 | 7.3 |
| 20 | 29.80 | 29.38 | 29.444 | 34.0 | 3 P | 26 0 | 3 A | 30 0 | 29.4 | 30.7 | 0.3 |
| 21 | 30.26 | 29.80 | 30.046 | 48.0 | 2:30 P | 22.0 | 7:30 A | 35.0 | 35.3 | 32.3 | 12.0 |
| 22 | 30.48 | 30 26 | 30.289 | 51.0 | 4 P | 26 0 | 3:30 A | 38.5 | 39.3 | 35.0 | 12.0 |
| 23 | 30.36 | 30.22 | 30.316 | 65.0 | 5 P | 31.0 | 6:30 A | 48.0 | 46.5 | 38.5 | 11.5 |
| 24 | 30.36 | 30.18 | 30.289 | 68.0 | 4:30 P | 28.0 | 6:30 A | 48.0 | 45.8 | 38 7 | 10.8 |
| 25 | 30 18 | 29.95 | 30.068 | 70.5 | 3:30 P | 27.0 | 6 A | 48.7 | 46.6 | 40 5 | 11.3 |
| 26 | 29 95 | 29.61 | 29 794 | 57.0 | 4 P | 36.0 | 6:30 A | 46 5 | 45 4 | 43.5 | 7.1 |
| 27 | 29.81 | 29.57 | 29.588 | 51.0 | 4 P | 39.0 | 5:30 A | 45 0 | 44 8 | 43 5 | 4 2 |
| 28 | 29.98 | 29.81 | 29.928 | 66.0 | 3:30 P | 35 0 | 12 P | 50.5 | 47.1 | 39.0 | 11.2 |
| 29 | 29.96 | 29.59 | 29 747 | 49.0 | 8:30 P | 29.0 | 4 A | 39.0 | 37.9 | 37.5 | 0.3 |
| 30 | 29.86 | 29.71 | 29.817 | 52 0 | 5 P | 35.5 | 7 A | 43.7 | 43.5 | 37.5 | 9.7 |
| 31 | 29 98 | 29.76 | 29.965 | 60.5 | 3 P | 34 0 | 6 A | 47.2 | 45.9 | 37.7 | 9.8 |

# DAILY SUMMARY.

| Day. | Humidity. | | | Wind. | | | | | Precipitation. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Total in Inches. | |
| | Mean Dew Point. | Mean Force vapor. | Mean Relative Humidit | Prevailing Direction. | Total Movement in Miles. | Maximum Pressure Per Square Ft | Miles per Hour. | Time. | Beginning. | Ending. | Rain.** | Snow. |
| 1 | 9.5 | .092 | 75.5 | N.W. | 214 | 1.5 | 17 | 12 M | | | | |
| 2 | 9.5 | .081 | 71.5 | W. | 93 | 0.5 | 10 | 3 A | | | | |
| 3 | 17.0 | .133 | 80.0 | S.S.W. | 121 | 1.0 | 14 | 2 P | | | | |
| 4 | 31.0 | .202 | 89.0 | S.S.E. | 112 | 0.5 | 10 | 4 P | | | | |
| 5 | 41.0 | .270 | 96.0 | S.S.E. | 247 | 2.0 | 20 | 1 P | 11 A | 12 P | .90 | |
| 6 | 13.0 | .096 | 85.0 | W.N.W. | 537 | 16.0 | 57 | 10½ A | | | | |
| 7 | 5.5 | .083 | 74.0 | W.S.W. | 419 | 6.5 | 36 | 9 A | | | | |
| 8 | 7.5 | .087 | 75.0 | W.S.W. | 225 | 2.0 | 20 | 3 P | | | | |
| 9 | 21.0 | .163 | 70.5 | W. | 227 | 2.5 | 22 | 1:30 P | | | | |
| 10 | 30.0 | .209 | 78.0 | S. W. | 161 | 1.5 | 17 | 4 P | | | | |
| 11 | 31.0 | .204 | 87.0 | S.S.W. | 34 | 0.0 | — | — | 11 A | 5 P | .03 | |
| 12 | 40.5 | .265 | 94.0 | S.S.W. | 143 | 3.0 | 24 | 11½ P | 3 A | 12 P | 08 | |
| 13 | 32.0 | .189 | 97.5 | N. | 231 | 5.5 | 33 | 10 P | 0 A | 10 P | .80 | |
| 14 | 15.5 | .110 | 82.0 | N.W. | 466 | 8.0 | 40 | 5 A | | | | |
| 15 | 21.5 | .168 | 71.0 | W.S.W. | 132 | 3.0 | 24 | 2 A | | | | |
| 16 | 36.5 | .242 | 89.5 | S.S.W. | 214 | 3.5 | 26 | 3 P | | | | |
| 17 | 28.0 | .216 | 69.5 | W.N.W. | 377 | 6.5 | 36 | 9 A | 0 A | 2 A | .01 | |
| 18 | 21.5 | .160 | 73.5 | W.N.W. | 402 | 6.0 | 35 | 6 A | | | | |
| 19 | 22.5 | .136 | 90.5 | W S.W. | 68 | 1.0 | 14 | 6 P | 5 P | 12 P | .25 | 2 |
| 20 | 30.0 | .171 | 97.5 | N.N.W. | 182 | 2.0 | 20 | 2 P | 0 A | 6 P | .44 | 3¾ |
| 21 | 26.5 | .207 | 70.5 | W. | 163 | 3.0 | 24 | 3 A | | | | |
| 22 | 25.5 | .251 | 56.0 | W. | 136 | 1.0 | 14 | 1 P | | | | |
| 23 | 32.0 | .275 | 64.5 | S.S.W. | 140 | 0.5 | 10 | 3 P | | | | |
| 24 | 32.5 | .275 | 68.5 | S. | 80 | 0.0 | — | — | | | | |
| 25 | 34.0 | .318 | 63.5 | N W. | 78 | 0.0 | — | — | | | | |
| 26 | 41.5 | .298 | 89.0 | W. | 80 | 1.5 | 17 | 6 P | 6 P | 12 P | .22 | |
| 27 | 43.0 | .289 | 96.5 | W. | 131 | 2.5 | 22 | 4 P | 0 A | 10 A | .03 | |
| 28 | 29.0 | .309 | 51.5 | N.W. | 238 | 2.5 | 22 | 5 A | | | | |
| 29 | 36.0 | .231 | 91.0 | S.W. | 48 | 4.5 | 30 | 10 P | 9:30 A | 10 P | .13 | |
| 30 | 30.0 | .272 | 62.5 | W.N.W | 364 | 5.5 | 33 | 1 P | 8:30 P | 10 P | .01 | |
| 31 | 30.5 | .275 | 63.5 | W.N.W. | 200 | 1.5 | 17 | 2 A | 11 P | | T | |

**Rain or melted snow at base of tower. * Included in following day.

# REMARKS

The weather during March was generally seasonablə and presented few features of interest. The transition from Winter to Spring was nearly complete when the month closed. The large amount of snow on the ground at the close of February showed but little shrinkage during the first half of the month but by the last of the month the snow, except where drifted, had entirely disappeared without causing extremely high water in the smaller streams of this locality. When the snow had disappeared it was found that there was but little frost in the ground and the fields dried rapidly. The last third of the month had a number of unusually warm days for the time of year.

The mean barometer was slightly lower than the normal and the range of pressure was rather large. Large fluctuations in pressure were recorded and the total wind movement was about ten per cent more than usual. The wind was nearly all from the Western points of the compass.

The mean temperature was practically normal and the range unusually large. This last feature was due to a maximum temperature nearly eight degrees higher than usual and a mimimum, nearly six degrees lower than usual. On the 25th the range for the day was nearly as large as a monthly range in mid-summer. The mean dew point was practically normal and the relative humidity slightly higher than usual.

The total precipation was about three-fourths of the normal and was well distributed throughout the month. At the equinoctial period the only snowstorm of the month occurred. This was nearly six inches but it melted in a few days. The amount of clear sunshiny weather was more than usual.

J. E. OSTRANDER, Meteorologist.

G. S. SMITH, Observer.

BULLETIN No. 376. APRIL, 1920

# Meteorological Observations
AT THE
# MASSACHUSETTS
# AGRICULTURAL EXPERIMENT
# STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.
*Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.*
*Height of Wind Instruments 72 ft. Time used, 75th Mer.*

## MONTHLY SUMMARY.

### **Pressure.** In inches.

| | |
|---|---|
| Maximum reduced to freezing | 29.84, 1st, 8 A; 26th, 8 A. |
| Minimum reduced to freezing | 28.89, 5th, 5 P |
| Reduced maximum reading | 30.14, 1st, 8 A 26th, 8 A. |
| Reduced minimum reading | 29.20, 5th, 5 P |
| Mean semi-daily reduced | 29.823 |
| Monthly range | 0.94 |

### ***Air Temperature.** In Degrees Fahr.

| | |
|---|---|
| Highest | 74.5, 20th, 3 P |
| Lowest | 22.0, 9th, 5 A; 10th, 6 A |
| Mean hourly | 43.2 |
| Mean of means of max. and min. | 43.2 |
| Mean sensible (wet bulb) | 38.6 |
| Monthly range | 52.5 |
| Highest mean daily | 53.6, 20th |
| Lowest mean daily | 29.4, 8th |
| Mean maximum | 52.5 |
| Mean minimum | 33.9 |
| Mean daily range | 18.6 |
| Greatest daily range | 42.0, 20th |
| Least daily range | 3.5, 2d |

### **Humidity.**

| | |
|---|---|
| Mean dew point | 33.2 |
| Mean force of vapor | .277 |
| Mean relative humidity | 72.5 |

### **Precipitation.** In inches.

| | |
|---|---|
| Total precipitation, in inches | 4.71 |
| Total snow, in inches | 1.5 |
| Number of days on which .01 inch or more rain fell | 12 |

Days of sleighing, None.

*Temperature in ground shelter.
**Reduced to freezing and sea-level.

### **Wind.**

| | |
|---|---|
| Total movement | 6158 m |
| Greatest daily movement | 507m, 6th |
| Least daily movement | 63m, 22d |
| Mean daily movement | 205m |
| Mean hourly velocity | 8.5m |

Maximum pressure per square foot, 8.5 lbs = 41m per hour, 6th, 1 P, W.N.W.

Maximum velocity for 5 minutes, 35m per hour, 6th, 1 P, W.N.W.

Prevailing direction, West Northwest.

Summary.

| | |
|---|---|
| West | 13 per cent |
| West Northwest | 20 " " |
| South Southwest | 10 " " |
| North | 13 " " |
| Northwest | 13 " " |
| Other directions | 31 " |

### **Weather.**

| | |
|---|---|
| Mean cloudiness observed | 51 per cent |
| Total cloudiness recorded by the Sun Thermometer | 184 hours = 46 per cent. |
| Number of clear days | 13 |
| Number of fair days | 5 |
| Number of cloudy days | 12 |

### **Bright Sunshine.**

Number hours recorded, 218 hrs, = 54 per cent.

**Rain.** 4th. 5th, 6th, 7th, 8th, 12th, 13th, 15th, 21st, 23d, 24th. 27th, 28th, 29th.

**Snow.** 4th, 6th, 7th, 8th.

**Thunder and Lightning.** 23d.

**Frost.** after the 15th: 18th, 20th, 26th.

**Gales.** 41m, 6th, W.N.W.; 37m, 13th, S.S.W.; 37m, 24th, N. W.

# DAILY SUMMARY.

| Day. | Barometer Reduced to Sea Level. | | | Temperature. Ground Shelter. | | | | | | | No. Hours of Bright Sunshine |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Maximum | Minimum. | Mean. Semi-daily | Maximum | Time. | Minimum. | Time. | Mean of Max. and Min. | Mean Hourly Draper. | Mean Sensible Wet Bulb. | |
| 1 | 30.14 | 30.01 | 30.109 | 60.5 | 3 P | 34.0 | 4 A | 47.3 | 44.6 | 38.7 | 9.8 |
| 2 | 30.08 | 29.61 | 29.803 | 37.5 | 6 P | 34.0 | 2 A | 35.7 | 35.7 | 35.7 | 0.0 |
| 3 | 29.99 | 29.86 | 29.933 | 59.0 | 4 P | 31.5 | 6 A | 45.2 | 45.8 | 39.5 | 11.9 |
| 4 | 30.01 | 29.77 | 29.899 | 44.0 | 0 A | 35.0 | 1:30 P | 39.5 | 37.4 | 35.5 | 0.0 |
| 5 | 29.79 | 29.20 | 29.399 | 40.5 | 6 P | 33.0 | 12 P | 36.7 | 37.7 | 36.5 | 0.0 |
| 6 | 29.81 | 29.32 | 29.656 | 38.5 | 1 P | 27.0 | 7:30 A | 32.7 | 32.4 | 28.5 | 10.0 |
| 7 | 29.79 | 29.51 | 29.580 | 41.0 | 4:30 P | 27.0 | 6:30 A | 34.0 | 33.3 | 29.3 | 6.5 |
| 8 | 29.84 | 29.65 | 29.725 | 35.0 | 4 P | 24.5 | 6:30 A | 29.7 | 29.4 | 25.7 | 11.6 |
| 9 | 29.96 | 29.84 | 29.875 | 38.0 | 3:30 P | 22.0 | 5 A | 30.0 | 30.7 | 27.3 | 11.0 |
| 10 | 30.02 | 29.84 | 29.911 | 53.5 | 5 P | 22.0 | 6 A | 37.7 | 37.7 | 34.0 | 12.5 |
| 11 | 30.01 | 29.90 | 29.963 | 52.5 | 2 P | 26.0 | 6 A | 39.3 | 40.1 | 36.5 | 10.8 |
| 12 | 30.01 | 29.67 | 29.874 | 51.5 | 1 P | 26.5 | 5 A | 39.0 | 41.2 | 37.5 | 4.7 |
| 13 | 29.67 | 29.37 | 29.480 | 55.0 | 11 A | 35.0 | 12 P | 45.0 | 46.0 | 41.5 | 0.0 |
| 14 | 29.86 | 29.57 | 29.724 | 50.5 | 3:30 P | 31.5 | 6 A | 41.0 | 40.6 | 34.5 | 11.9 |
| 15 | 29.90 | 29.75 | 29.834 | 58.0 | 2 P | 30.0 | 6 A | 44.0 | 45.0 | 41.7 | 11.5 |
| 16 | 29.80 | 29.63 | 29.673 | 54.0 | 4 P | 43.5 | 5 A | 48.7 | 47.3 | 42.5 | 2.3 |
| 17 | 30.02 | 29.75 | 29.924 | 57.0 | 5 P | 42.5 | 12 P | 49.7 | 46.5 | 41.5 | 8.5 |
| 18 | 30.10 | 30.02 | 30.088 | 58.0 | 11:30 A | 31.0 | 6 A | 44.5 | 46.1 | 41.0 | 10.7 |
| 19 | 30.08 | 29.90 | 29.990 | 68.0 | 5 P | 34.0 | 5 A | 51.0 | 52.3 | 45.3 | 12.8 |
| 20 | 30.07 | 29.92 | 29.999 | 74.5 | 3 P | 32.5 | 6 A | 53.5 | 53.6 | 44.0 | 12.0 |
| 21 | 29.95 | 29.53 | 29.684 | 51.0 | 0 A | 43.5 | 6 A | 47.3 | 45.4 | 44.0 | 0.0 |
| 22 | 29.96 | 29.62 | 29.862 | 58.0 | 5 P | 42.5 | 6 A | 50.3 | 47.7 | 44.0 | 3.7 |
| 23 | 29.93 | 29.55 | 29.635 | 53.0 | 6 P | 44.5 | 6 A | 48.7 | 48.3 | 47.3 | 0.0 |
| 24 | 29.88 | 29.54 | 29.701 | 51.0 | 2 P | 40.0 | 12 P | 45.5 | 45.3 | 39.0 | 10.1 |
| 25 | 30.09 | 29.88 | 30.035 | 56.5 | 5 P | 36.5 | 6 A | 46.5 | 46.0 | 39.7 | 12.5 |
| 26 | 30.14 | 29.89 | 30.021 | 63.5 | 2:30 P | 31.5 | 6 A | 47.5 | 49.4 | 41.7 | 11.3 |
| 27 | 30.03 | 29.87 | 29.943 | 52.5 | 3 P | 38.0 | 12 P | 45.3 | 48.9 | 40.0 | 2.5 |
| 28 | 29.87 | 29.54 | 29.657 | 49.0 | 5:30 P | 40.0 | 0 A | 44.5 | 44.9 | 39.0 | 3.5 |
| 29 | 29.92 | 29.71 | 29.819 | 55.5 | 3:30 P | 38.0 | 4 A | 46.7 | 46.5 | 43.7 | 5.0 |
| 30 | 29.99 | 29.87 | 29.902 | 60.0 | 3 P | 40.0 | 4:30 A | 50.0 | 49.2 | 43.3 | 11.3 |

# DAILY SUMMARY.

| Day. | Humidity. | | | Wind. | | | | | Precipitation. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Total in Inches. | |
| | Mean Dew Point. | Mean Force vapor. | Mean Relative Humidity | Prevailing Direction. | Total Movement in Miles. | Maximum Pressure Per Square Ft | Miles per Hour. | Time. | Beginning. | Ending. | Rain.** | Snow. |
| 1 | 32.0 | .283 | 64.5 | S.S.E. | 133 | 1.5 | 17 | 6 P | | | | |
| 2 | 35.5 | .208 | 98.0 | N. | 143 | 1.5 | 17 | 12 P | | | | |
| 3 | 29.5 | .317 | 54.5 | W. | 150 | 5.0 | 32 | 2 P | | | | |
| 4 | 32.0 | .219 | 82.5 | W.N.W. | 127 | 0.0 | — | — | 11 A | 12 P | .42 | T |
| 5 | 35.0 | .224 | 91.5 | N.N.W. | 140 | 1.5 | 17 | 8 P | 0 A | 7 P | .52 | |
| 6 | 24.5 | .167 | 79.5 | W.N.W. | 507 | 8.5 | 41 | 1 P | 8 A | 9 A | T | T |
| 7 | 25.0 | .174 | 84.0 | W.N.W. | 217 | 4.0 | 28 | 4 P | 2 A | 10 A | .16 | 1½ |
| 8 | 19.5 | .156 | 70.0 | W.N.W. | 387 | 5.0 | 32 | 12 M | 11 A | 1 P | T | T |
| 9 | 19.0 | .172 | 61.5 | W.N.W. | 197 | 1.5 | 17 | 3:30 P | | | | |
| 10 | 25.5 | .236 | 58.0 | N. | 139 | 1.0 | 14 | 11 P | | | | |
| 11 | 31.5 | .244 | 72.0 | N.N.E. | 121 | 1.0 | 14 | 8 A | | | | |
| 12 | 33.5 | .263 | 76.5 | S.S.W. | 111 | 2.5 | 22 | 2 P | 6 P | 12 P | .44 | |
| 13 | 37.5 | .287 | 79.0 | W. | 346 | 7.0 | 37 | 1 P | 0 A | 6 P | .86 | |
| 14 | 25.5 | .250 | 55.5 | N.W. | 246 | 2.5 | 22 | 10 A | | | | |
| 15 | 36.5 | .309 | 72.5 | W.S.W. | 313 | 3.0 | 24 | 9 P | 7 P | 11 P | .02 | |
| 16 | 39.0 | .304 | 78.5 | W. | 244 | 3.0 | 24 | 8 A | | | | |
| 17 | 35.0 | .293 | 69.5 | E.S.E. | 119 | 1.0 | 14 | 2 P | | | | |
| 18 | 32.5 | .323 | 57.0 | N. | 168 | 3.5 | 26 | 1 P | | | | |
| 19 | 35.0 | .414 | 49.0 | N.N.W. | 303 | 5.5 | 33 | 10 A | | | | |
| 20 | 33.5 | .404 | 49.0 | W.S.W. | 117 | 1.0 | 14 | 10 A | | | | |
| 21 | 43.0 | .300 | 92.0 | N.N.E. | 140 | 0.0 | — | — | 1 A | 12 P | .45 | |
| 22 | 42.0 | .312 | 85.5 | S.S.W. | 63 | 0.0 | — | — | | | | |
| 23 | 45.5 | .350 | 88.0 | S.S.W. | 131 | 2.0 | 20 | 9 A | 1 A | 12 P | .44 | |
| 24 | 31.5 | .286 | 63.0 | N.W. | 360 | 7.0 | 37 | 2 P | 0 A | 3 A | .08 | |
| 25 | 30.0 | .302 | 55.5 | N.W. | 302 | 4.5 | 30 | 1 P | | | | |
| 26 | 33.5 | .348 | 66.5 | N.W. | 138 | 1.5 | 17 | 11 A | | | | |
| 27 | 37.5 | .265 | 85.0 | E.S.E. | 132 | 1.0 | 14 | 2 P | 6 P | 12 P | .28 | |
| 28 | 37.0 | .248 | 89.5 | N. | 172 | 2.5 | 22 | 0:30 P | 0 A | 2 P | 1.03 | |
| 29 | 41.0 | .321 | 80.5 | W. | 247 | 5.5 | 33 | 6 P | 6 P | 7 P | .01 | |
| 30 | 37.5 | .332 | 67.5 | W.N.W. | 245 | 2.0 | 20 | 1 P | | | | |

**Rain or melted snow at base of tower. * Included in following day.

## REMARKS

The weather during April was considerably colder than the normal for this month, and the precipitation was greater than usual. A large wind movement was recorded, although only a few gales were registered. The seasonal progress was slow, and but little work was done toward spring planting. But few frosts were noted after the middle of the month.

A comparison of the records of the severel weather elements with their respective normals shows the following features of interest: The mean barometer was unusually low and the range rather small. The mean daily barometer was above 30 inches on only four days. Although the fluctuations in pressure were not large the total wind movement was nearly one-sixth more than usual. Most of the wind was from the northwest quadrant.

The mean hourly temperature was more than three degrees below the normal, although the minimum for the month was practically normal. The maximum temperature was about five degrees lower than usual. The range of temperature on the 20th was unusually large.

The mean dew point and relative humidity were both considerably more than the normal.

The total precipitation was more than fifty per cent above the normal and was well distributed throughout the month. One snow storm and one thunder storm were noted.

The percentage of sunshine was nearly the normal amount.

J. E. OSTRANDER, Meteorologist.

G. S. SMITH, Observer.

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*Correction to March Bulletin, No. 375.*

Precipitation on the 6th should read 0 A to 1 P., .73 in rain column and 4 inches of snow in snow column, and the total precipitation should read 3.63 inches. Total snow $9\frac{3}{4}$ inches.

BULLETIN No. 377. MAY, 1920

# Meteorological Observations
AT THE
# MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.
*Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.*
*Height of Wind Instruments 72 ft. Time used, 75th Mer.*

## MONTHLY SUMMARY.

**Pressure.** In inches.

| | |
|---|---|
| Maximum reduced to freezing | 30.15, 17th, 8 A |
| Minimum reduced to freezing | 29.42, 1st, 5 A |
| Reduced maximum reading | 30.45, 17th, 8 A |
| Reduced minimum reading | 29.72, 1st, 5 A |
| Mean semi-daily reduced | 30.056 |
| Monthly range | 0 73 |

***Air Temperature.** In Degrees Fahr.

| | |
|---|---|
| Highest | 83 5, 28th, 3 P |
| Lowest | 30.5, 5th, 5,30 A |
| Mean hourly | 54.6 |
| Mean of means of max. and min. | 54.5 |
| Mean sensible (wet bulb) | 49.2 |
| Monthly range | 53.0 |
| Highest mean daily | 67.6, 28th |
| Lowest mean daily | 41.0, 4th |
| Mean maximum | 66.5 |
| Mean minimum | 42.6 |
| Mean daily range | 23.9 |
| Greatest daily range | 39.0, 17th |
| Least daily range | 5.5, 21st |

**Humidity.**

| | |
|---|---|
| Mean dew point | 44.3 |
| Mean force of vapor | .431 |
| Mean relative humidity | 71.1 |

**Precipitation.** In inches.

| | |
|---|---|
| Total precipitation, in inches | 3.65 |
| Number of days on which .01 inch or more rain fell | 10 |

*Temperature in ground shelter.
**Reduced to freezing and sea-level.

**Wind.**

| | |
|---|---|
| Total movement | 3703 m |
| Greatest daily movement | 207m, 10th |
| Least daily movement | 42m, 24th |
| Mean daily movement | 120m |
| Mean hourly velocity | 5.0m |

Maximum pressure per square foot, 5.0 lbs = 32m per hour, 10th, 12 P, N.N.W.
Maximum velocity for 5 minutes, 30m per hour, 10th, 11 P, N.N.W.
Prevailing direction, West.

Summary.

| | |
|---|---|
| West | 16 per cent |
| West Northwest | 13 " " |
| South Southwest | 13 " " |
| North Northwest | 10 " " |
| Northwest | 10 " " |
| West Southwest | 10 " " |
| Southwest | 10 " " |
| Other directions | 18 " |

**Weather.**

| | |
|---|---|
| Mean cloudiness observed | 39 per cent |
| Total cloudiness recorded by the Sun Thermometer | 172 hours = 38 per cent. |
| Number of clear days | 14 |
| Number of fair days | 13 |
| Number of cloudy days | 4 |

**Bright Sunshine.**

Number hours recorded, 281 hrs, = 62 per cent.

**Rain**, 1st, 2d, 3d, 4th. 5th, 7th, 8th, 9th, 10th, 11th, 13th, 14th, 20th, 21st, 22d.

**Thunder and Lightning**, 14th, 20th.

**Hail**, 2d, 4th.

**Gales**, none.

# DAILY SUMMARY.

| Day. | Barometer Reduced to Sea Level. | | | Temperature. Ground Shelter. | | | | | | | No. Hours of Bright Sunshine |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Maximum | Minimum. | Mean. Semi-daily | Maximum | Time. | Minimum. | Time. | Mean of Max. and Min. | Mean Hourly Draper. | Mean Sensible Wet Bulb. | |
| 1 | 29 82 | 29 72 | 29.768 | 55.5 | 3 P | 41.0 | 12 P | 48.3 | 48.3 | 39.7 | 5.9 |
| 2 | 29.90 | 29 77 | 29.821 | 53.0 | 1:30 P | 34.5 | 6 A | 43.7 | 49.0 | 42.0 | 9.3 |
| 3 | 30.00 | 29.90 | 29.976 | 54.0 | 3 P | 39 0 | 7 A | 46.5 | 46.5 | 43 0 | 8.7 |
| 4 | 30.21 | 29.93 | 30.043 | 59.0 | 4:30 P | 35.0 | 12 P | 47.0 | 41.0 | 37.3 | 6.3 |
| 5 | 30.35 | 30.21 | 30.296 | 63.0 | 5 P | 30 5 | 5:30 A | 46 7 | 47.3 | 43.0 | 13.5 |
| 6 | 30.34 | 30.17 | 30.258 | 69.0 | 4:30 P | 33.0 | 6 A | 51.0 | 51 5 | 45.0 | 13.0 |
| 7 | 30.22 | 30.08 | 30.143 | 66.0 | 0:30 P | 37.5 | 6 A | 51.7 | 52.2 | 44 3 | 8.5 |
| 8 | 30.13 | 29.89 | 29.999 | 51.5 | 6 P | 44 0 | 6 A | 47.7 | 48.7 | 48.3 | 0.0 |
| 9 | 29 89 | 29.77 | 29.822 | 67.5 | 3 P | 42.0 | 7 A | 54.7 | 54.0 | 48.5 | 11.0 |
| 10 | 30.01 | 29.78 | 29.892 | 65.0 | 9:30 A | 39.5 | 6 A | 52.3 | 54.7 | 48.0 | 6 0 |
| 11 | 30 05 | 29.92 | 29.983 | 51.5 | 3 P | 39.0 | 5 A | 45.3 | 44 7 | 43.0 | 0.0 |
| 12 | 30.00 | 29.92 | 29.963 | 66.5 | 4 P | 34 0 | 5:30 A | 50.3 | 51.9 | 46.0 | 12.3 |
| 13 | 29.94 | 29.84 | 29.899 | 62.0 | 3:30 P | 44.0 | 7 A | 53.0 | 52 0 | 46 3 | 5 5 |
| 14 | 30.10 | 29.94 | 30.034 | 54 5 | 1:30 P | 42.0 | 12 P | 48.3 | 47.5 | 44.3 | 5.3 |
| 15 | 30.34 | 30 10 | 30.219 | 61.5 | 5:30 P | 41.0 | 5 A | 51 3 | 50.2 | 46.5 | 11.0 |
| 16 | 30.43 | 30.34 | 30.396 | 71 0 | 6 P | 35.0 | 6 A | 53.0 | 54.3 | 47 0 | 13 4 |
| 17 | 30 45 | 30.25 | 30.349 | 77.0 | 4:30 P | 38.0 | 6 A | 57.5 | 59.2 | 50.5 | 13 2 |
| 18 | 30.27 | 30 09 | 30.281 | 74.0 | 4 P | 44.5 | 6 A | 59.3 | 59 0 | 50.0 | 13 2 |
| 19 | 30.14 | 29.93 | 30.020 | 78.5 | 4 P | 43 0 | 5:30 A | 60.7 | 62.0 | 55.3 | 12.8 |
| 20 | 29.99 | 29.96 | 29.983 | 74.5 | 2 P | 53 5 | 5:30 A | 64.0 | 62 7 | 59.0 | 8.7 |
| 21 | 29.98 | 29.93 | 29.957 | 60.5 | 4 P | 55 0 | 12 P | 57.7 | 57 9 | 56.0 | 0.3 |
| 22 | 30.20 | 29.93 | 30.066 | 57.0 | 8 A | 45.0 | 12 P | 51.0 | 50.8 | 49.7 | 0.6 |
| 23 | 30.30 | 30.20 | 30.260 | 60.0 | 4 P | 42.5 | 7 A | 51.3 | 50 2 | 45 7 | 7.9 |
| 24 | 30.23 | 30.11 | 30.163 | 65.5 | 5 P | 48.0 | 6 A | 56 3 | 55.0 | 50.5 | 7.0 |
| 25 | 30.12 | 30.04 | 30.094 | 70.0 | 4 P | 47 0 | 6 A | 58.5 | 58.3 | 54.0 | 7.6 |
| 26 | 30.08 | 30.00 | 30.051 | 76.5 | 5 P | 53 0 | 5 A | 64.7 | 64.5 | 58.5 | 12.4 |
| 27 | 30.05 | 29.89 | 29.970 | 82.0 | 3:30 P | 46.0 | 6 A | 64 0 | 64.5 | 57.7 | 13.3 |
| 28 | 29.97 | 29.77 | 29 842 | 83 5 | 3 P | 51.0 | 5:30 A | 67.3 | 67.6 | 56.5 | 13.5 |
| 29 | 30.03 | 29.83 | 29.936 | 77.0 | 5 P | 48.0 | 5 A | 62.5 | 63 4 | 55.7 | 13 9 |
| 30 | 30.12 | 30.03 | 30.121 | 78.0 | 4 P | 48 0 | 5:30 A | 63.0 | 62 5 | 57.0 | 13.5 |
| 31 | 30.21 | 30.07 | 30 143 | 77.0 | 2 P | 46.0 | 5 A | 61.5 | 60.0 | 58 3 | 12.9 |

# DAILY SUMMARY.

| Day. | Humidity. | | | Wind. | | | | | Precipitation. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Mean Dew Point. | Mean Force vapor. | Mean Relative Humidity | Prevailing Direction. | Total Movement in Miles. | Maximum Pressure Per Square Ft | Miles per Hour. | Time. | Beginning. | Ending. | Total in Inches. | |
| | | | | | | | | | | | Rain.** | Snow. |
| 1 | 31.5 | .309 | 59.0 | N.W. | 167 | 3.0 | 24 | 5 P | 3:30 P | 4:30 P | T | |
| 2 | 37.5 | .304 | 75.0 | N. W. | 170 | 2.0 | 20 | 3 P | 9 A | 4 P | .03 | |
| 3 | 39.0 | .312 | 75.5 | W. | 97 | 0.0 | — | — | 3 P | 6 P | T | |
| 4 | 33.5 | .248 | 80.0 | N.N.W. | 154 | 3.5 | 26 | 5:30 P | 3 A | 6 P | .30 | |
| 5 | 35.5 | .350 | 60.0 | N.N.W. | 107 | 1.5 | 17 | 10 P | | | | |
| 6 | 38.5 | .369 | 64.5 | W. | 115 | 1.5 | 17 | 9:30 P | | | | |
| 7 | 37.0 | .372 | 60.5 | S.W. | 130 | 3.5 | 26 | 7 P | 3 P | 4 P | T | |
| 8 | 46.5 | .357 | 89.0 | W. | 73 | 0.0 | — | — | 10 A | 12 P | .90 | |
| 9 | 44.5 | .400 | 76.0 | N.W. | 131 | 3.0 | 24 | 6 P | 0 A | 4 A | .08 | |
| 10 | 42.0 | .427 | 62.0 | W.N.W. | 207 | 5.0 | 32 | 12 P | 3 P | 5 P | T | |
| 11 | 41.0 | .299 | 85.5 | W.S.W. | 85 | 1.0 | 14 | 2 P | 7 A | 4 P | .07 | |
| 12 | 38.0 | .403 | 57.5 | W.N.W. | 79 | 1.0 | 14 | 2 P | | | | |
| 13 | 42.5 | .367 | 72.0 | W.S.W. | 79 | 0.5 | 10 | 4 P | 4 A | 12 P | .05 | |
| 14 | 42.0 | .317 | 84.5 | W.S.W. | 103 | 0.5 | 10 | 4 P | 0 A | 9 P | .79 | |
| 15 | 41.0 | .364 | 71.0 | N.N.W. | 178 | 2.0 | 20 | 11 A | | | | |
| 16 | 37.5 | .452 | 49.5 | W.N.W. | 71 | 0.5 | 10 | 10 A | | | | |
| 17 | 42.5 | .502 | 54.5 | S.S.W. | 69 | 1.0 | 14 | 6 P | | | | |
| 18 | 40.5 | .506 | 49.5 | S.S.W. | 153 | 1.5 | 17 | 10 P | | | | |
| 19 | 50.0 | .545 | 66.0 | S.W. | 99 | 1.0 | 14 | 8 P | | | | |
| 20 | 57.5 | .538 | 89.5 | S.W. | 105 | 1.5 | 17 | 4 P | 4 P | 12 P | .16 | |
| 21 | 55.0 | .430 | 91.5 | S.S.W. | 79 | 0.5 | 10 | 6 P | 0 A | 12 P | 1.14 | |
| 22 | 49.0 | .382 | 91.5 | N.E. | 182 | 2.5 | 22 | 6 P | 0 A | 9 P | .13 | |
| 23 | 43.5 | .340 | 81.5 | E. | 161 | 0.0 | — | — | | | | |
| 24 | 47.0 | .425 | 76.0 | E.S.E. | 42 | 0.0 | — | — | | | | |
| 25 | 46.5 | .490 | 64.5 | E.N.E. | 98 | 1.0 | 14 | 6 P | | | | |
| 26 | 53.5 | .625 | 65.5 | E. | 143 | 0.5 | 10 | 10 A | | | | |
| 27 | 53.0 | .611 | 67.0 | W. | 49 | 2.0 | 20 | 10 P | | | | |
| 28 | 48.5 | .644 | 53.5 | W. | 129 | 0.0 | — | — | | | | |
| 29 | 50.0 | .578 | 61.0 | N. | 142 | 1.0 | 14 | 6 P | | | | |
| 30 | 53.5 | .582 | 86.0 | W.N.W | 104 | 2.0 | 20 | 6 P | | | | |
| 31 | 56.5 | .517 | 85.5 | S.S.W. | 202 | 3.0 | 24 | 2 P | | | | |

**Rain or melted snow at base of tower. * Included in following day.

## REMARKS

The backwardness of the season, which was so pronounced at the close of April, continued throughout this month. In most respects the season's advance was fully three week's behind the normal. Temperatures ruled low during the first half of the month, and considerable wet weather helped to retard the season's progress. The last third of the month was free from rain, and somewhat higher temperatures were recorded. On the whole the weather was very unfavorable for growing crops. The soil moisture was excessive on all but the lightest soil.

An examination of the records of the several weather elements shows the following features of interest: The mean barometer was considerably higher than the normal and the range of pressure was less than usual. The total wind movement was about 80 per cent of the normal, and no gales were noted. The wind direction was more variable than usual.

The mean temperature was three degrees below the normal and the range less than usual. The maximum temperature was more than three degrees below the normal and the minimum was practically normal. On only two days near the last of the month was a temperature above 80 degrees recorded. A few light frosts were noted early in the month.

The mean dew point was more than three degrees lower than usual, and the relative humidity slightly higher than the normal.

The total precipitation was nearly normal, and most of it occurred during two heavy storms; the first on the 8th—9th, and the second on the 20th—22d. This second storm proved to be the last one of the month and was followed by some fairly seasonable weather.

The amount of sunshine was considerably more than normal.

J. E. OSTRANDER, Meteorologist.

G. S. SMITH, Observer.

BULLETIN No. 378. JUNE, 1920

# Meteorological Observations

AT THE

# MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.

*Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.*

*Height of Wind Instruments 72 ft. Time used, 75th Mer.*

## MONTHLY SUMMARY.

**Pressure.** In inches.

| | |
|---|---|
| Maximum reduced to freezing | 30.04, 27th, 9 A |
| Minimum reduced to freezing | 29.29, 16th, 2 P |
| Reduced maximum reading | 30.32, 27th, 9 A |
| Reduced minimum reading | 29.54, 16th, 2 P |
| Mean semi-daily reduced | 29.952 |
| Monthly range | 0.78 |

***Air Temperature.** In Degrees Fahr.

| | |
|---|---|
| Highest | 88.0, 11th, 2 P; 27th, 4 P |
| Lowest | 45.0, 20th, 6 A |
| Mean hourly | 64.5 |
| Mean of means of max. and min. | 64.7 |
| Mean sensible (wet bulb) | 59.4 |
| Monthly range | 43.0 |
| Highest mean daily | 73.6, 2d |
| Lowest mean daily | 50.3, 18th |
| Mean maximum | 75.3 |
| Mean minimum | 54.1 |
| Mean daily range | 21.2 |
| Greatest daily range | 35.5, 10th |
| Least daily range | 6.0, 18th |

**Humidity.**

| | |
|---|---|
| Mean dew point | 56.9 |
| Mean force of vapor | .618 |
| Mean relative humidity | 77.5 |

**Precipitation.** In inches.

| | |
|---|---|
| Total precipitation, in inches | 6.26 |
| Number of days on which .01 inch or more rain fell | 12 |

**Wind.**

| | |
|---|---|
| Total movement | 3055 m |
| Greatest daily movement | 201m, 7th |
| Least daily movement | 30m, 24th |
| Mean daily movement | 102m |
| Mean hourly velocity | 4.2m |

Maximum pressure per square foot, 3.5 lbs = 26m per hour, 29th, 3 P, S.

Maximum velocity for 5 minutes, 24m per hour, 29th, 2P, S.

Prevailing direction, North.

Summary.

| | |
|---|---|
| North Northeast | 23 per cent |
| North Northwest | 10 " " |
| South | 23 " " |
| South Southwest | 10 " " |
| Other directions | 34 " |

**Weather.**

| | |
|---|---|
| Mean cloudiness observed | 51 per cent |
| Total cloudiness recorded by the Sun Thermometer | 216 hours = 47 per cent. |
| Number of clear days | 9 |
| Number of fair days | 13 |
| Number of cloudy days | 8 |

**Bright Sunshine.**

Number hours recorded, 241 hrs, 53 = per cent.

**Rain.** 3d, 5th. 6th, 13th, 15th, 16th, 17th, 18th, 21st, 22d, 28th, 29th, 30th.

**Thunder and Lightning.** 15th, 29th, 30th.

**Hail.** 29th.

**Gales.** none.

---

*Temperature in ground shelter.

**Reduced to freezing and sea-level.

# DAILY SUMMARY.

| Day. | Barometer Reduced to Sea Level. | | | Temperature. Ground Shelter. | | | | | | | No. Hours of Bright Sunshine |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Maximum | Minimum. | Mean. Semi-daily | Maximum | Time. | Minimum. | Time. | Mean of Max. and Min. | Mean Hourly Draper. | Mean Sensible Wet Bulb. | |
| 1 | 30.09 | 29.97 | 30.037 | 85.0 | 2:30 P | 54.0 | 5 A | 69.5 | 68.9 | 63.5 | 11.7 |
| 2 | 30.02 | 29.82 | 29.920 | 87.5 | 2:30 P | 60.5 | 5 A | 74.0 | 73.6 | 68.5 | 12.3 |
| 3 | 30.06 | 29.83 | 29.937 | 78.0 | 11:30 A | 63.0 | 12 P | 70.5 | 69.0 | 63.3 | 5.5 |
| 4 | 30.18 | 30.06 | 30.134 | 68.0 | 1:30 P | 54.0 | 6 A | 61.0 | 62.2 | 54.7 | 10.5 |
| 5 | 30.12 | 29.87 | 29.979 | 58.0 | 0 A | 48.0 | 12 P | 53.0 | 51.3 | 49.5 | 0.0 |
| 6 | 29.88 | 29.84 | 29.847 | 63.0 | 4 P | 48.0 | 0 A | 55.5 | 53.9 | 51.7 | 2.7 |
| 7 | 29.96 | 29.85 | 29.911 | 63.0 | 3 P | 51.0 | 5 A | 57.0 | 57.7 | 52.0 | 7.7 |
| 8 | 30.01 | 29.95 | 29.980 | 64.0 | 6 P | 46.0 | 5 A | 55.0 | 56.4 | 52.5 | 7.0 |
| 9 | 30.07 | 29.99 | 30.032 | 78.0 | 4 P | 48.0 | 5 A | 63.0 | 63.5 | 56.5 | 8.0 |
| 10 | 30.07 | 29.90 | 29.990 | 83.0 | 5 P | 47.5 | 5 A | 65.3 | 65.4 | 58.3 | 10.5 |
| 11 | 29.96 | 29.82 | 29.897 | 88.0 | 2 P | 55.5 | 5 A | 71.7 | 70.7 | 62.0 | 9.3 |
| 12 | 30.02 | 29.91 | 29.977 | 80.0 | 1:30 P | 63.0 | 12 P | 71.5 | 70.6 | 62.3 | 9.5 |
| 13 | 30.00 | 29.87 | 29.932 | 63.0 | 0 A | 55.0 | 9 A | 59.0 | 58.0 | 54.3 | 0.0 |
| 14 | 29.90 | 29.76 | 29.822 | 84.0 | 3:30 P | 54.0 | 6 A | 69.0 | 68.7 | 61.7 | 12.0 |
| 15 | 29.82 | 29.65 | 29.706 | 82.5 | 1 P | 61.5 | 5:30 A | 72.0 | 70.2 | 62.3 | 9.5 |
| 16 | 29.65 | 29.54 | 29.556 | 75.0 | 3 P | 60.0 | 12 P | 67.5 | 66.7 | 64.0 | 4.4 |
| 17 | 29.79 | 29.65 | 29.714 | 60.0 | 0 A | 51.0 | 12 P | 55.5 | 54.6 | 53.0 | 0.0 |
| 18 | 30.00 | 29.79 | 29.926 | 54.0 | 12 M | 48.0 | 12 P | 51.0 | 50.3 | 48.7 | 0.0 |
| 19 | 30.13 | 29.99 | 30.082 | 71.0 | 4 P | 46.5 | 3:30 A | 58.7 | 58.2 | 54.5 | 11.0 |
| 20 | 30.18 | 30.10 | 30.144 | 75.5 | 4 P | 45.0 | 6 A | 60.3 | 60.5 | 58.0 | 12.0 |
| 21 | 30.12 | 29.74 | 29.822 | 61.0 | 12 P | 52.0 | 7 A | 56.5 | 56.7 | 56.0 | 0.5 |
| 22 | 29.86 | 29.74 | 29.810 | 75.0 | 12 M | 61.0 | 6 A | 68.0 | 66.8 | 63.0 | 7.0 |
| 23 | 30.10 | 29.86 | 30.034 | 79.0 | 2 P | 57.0 | 5 A | 68.0 | 67.9 | 63.0 | 12.0 |
| 24 | 30.15 | 30.10 | 30.136 | 80.0 | 5 P | 49.0 | 6 A | 64.5 | 68.9 | 62.0 | 12.4 |
| 25 | 30.14 | 30.07 | 30.136 | 82.0 | 5 P | 57.0 | 12 P | 69.0 | 69.3 | 59.5 | 12.8 |
| 26 | 30.27 | 30.14 | 30.228 | 83.5 | 4 P | 49.5 | 5 A | 66.5 | 68.9 | 62.0 | 13.7 |
| 27 | 30.32 | 30.20 | 30.264 | 88.0 | 4 P | 53.0 | 6 A | 70.5 | 72.1 | 63.7 | 13.0 |
| 28 | 30.20 | 29.94 | 30.049 | 83.5 | 12 M | 57.0 | 5:30 A | 70.3 | 71.3 | 68.0 | 9.8 |
| 29 | 29.94 | 29.79 | 29.850 | 83.5 | 1 P | 64.0 | 12 P | 73.7 | 70.5 | 67.7 | 6.7 |
| 30 | 29.83 | 29.69 | 29.702 | 82.0 | 4 P | 64.5 | 3 A | 73.3 | 71.3 | 70.5 | 9.5 |

# DAILY SUMMARY.

| Day. | Humidity. | | | Wind. | | | | | Precipitation. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Total in Inches. | |
| | Mean Dew Point. | Mean Force vapor. | Mean Relative Humidity | Prevailing Direction. | Total Movement in Miles. | Maximum Pressure Per Square Ft | Miles per Hour. | Time. | Beginning. | Ending. | Rain.** | Snow. |
| 1 | 58.5 | .720 | 73.0 | S.S.W. | 122 | 1.5 | 17 | 5 P | | | | |
| 2 | 67.0 | .805 | 82.0 | S. | 171 | 3.0 | 24 | 5 P | | | | |
| 3 | 69.5 | .784 | 87.0 | W.N.W. | 102 | 1.0 | 14 | 1 P | 1:30 P | 3 P | .04 | |
| 4 | 49.5 | .551 | 62.5 | N.N.E. | 107 | 1.0 | 14 | 2 A | | | | |
| 5 | 48.5 | .364 | 93.5 | N. | 135 | 0.5 | 10 | 8 A | 1 A | 12 P | .61 | |
| 6 | 50.0 | .347 | 86.5 | W.N.W. | 113 | 0.5 | 10 | 1 P | 0 A | 2 P | .17 | |
| 7 | 47.5 | .473 | 69.5 | N.N.W. | 201 | 2.5 | 22 | 11 P | | | | |
| 8 | 47.5 | .493 | 67.0 | N.N.E. | 68 | 0.5 | 10 | 9 A | | | | |
| 9 | 52.0 | .569 | 69.0 | N.E. | 97 | 1.0 | 14 | 1 P | | | | |
| 10 | 54.5 | .675 | 69.5 | S.W. | 84 | 0.5 | 10 | 8 P | | | | |
| 11 | 58.5 | .709 | 72.0 | N.N.W. | 117 | 0.5 | 10 | 5 P | | | | |
| 12 | 57.0 | .750 | 64.0 | N.N.E. | 127 | 1.0 | 14 | 1 P | | | | |
| 13 | 53.0 | .460 | 86.5 | S. | 105 | 0.0 | — | — | 2 A | 10 A | .15 | |
| 14 | 57.5 | .730 | 70.0 | N.N.W. | 70 | 1.0 | 14 | 5 P | | | | |
| 15 | 60.0 | .648 | 83.0 | S.W. | 88 | 3.0 | 24 | 4 P | 3 P | 12 P | .32 | |
| 16 | 62.5 | .643 | 88.0 | N.N.E. | 38 | 0.5 | 10 | 10 P | 0 A | 5 P | .14 | |
| 17 | 51.0 | .403 | 86.5 | N.E. | 90 | 0.5 | 10 | 10 P | 0 A | 12 P | 2.46 | |
| 18 | 48.5 | .362 | 90.5 | N.N.E. | 140 | 0.5 | 10 | 10 A | 0 A | 5 P | .36 | |
| 19 | 51.0 | .485 | 77.0 | N.N.E. | 51 | 1.5 | 17 | 11 A | | | | |
| 20 | 54.5 | .546 | 76.0 | S. | 65 | 2.0 | 20 | 7 P | | | | |
| 21 | 55.0 | .467 | 93.0 | N. | 53 | 3.0 | 24 | 1 P | 2 A | 5 P | .35 | |
| 22 | 61.5 | .633 | 87.5 | S. | 72 | 2.5 | 22 | 2 P | 8 A | 1 P | .06 | |
| 23 | 64.0 | .670 | 76.0 | S.S.W. | 90 | 0.0 | — | — | | | | |
| 24 | 58.5 | .657 | 74.5 | S.S.W. | 30 | 0.0 | — | — | | | | |
| 25 | 53.5 | .729 | 58.5 | N.N.E. | 124 | 2.5 | 22 | 3 P | | | | |
| 26 | 57.0 | .732 | 64.5 | E.N.E. | 95 | 1.0 | 14 | 12 M | | | | |
| 27 | 59.0 | .760 | 67.5 | S. | 47 | 0.5 | 10 | 4 P | | | | |
| 28 | 65.5 | .815 | 78.5 | S.S.E. | 87 | 0.5 | 10 | 12 M | 1 P | 2 P | T | |
| 29 | 65.5 | .754 | 82.5 | S. | 198 | 3.5 | 26 | 3 P | 1:30 P | 9 P | 1.40 | |
| 30 | 69.5 | .754 | 88.5 | S. | 168 | 1.5 | 17 | 1 P | 5 P | 6 P | .20 | |

**Rain or melted snow at base of tower. * Included in following day.

## REMARKS

The weather during June was more nearly normal than for some months past, although having some unusual features. The temperature was a little lower than usual and high temperatures were not registered. Some unusually heavy rain-storms occurred and the percipitation was very large. The ground in many places is excessively wetand growing crops have not made good progress. The last week of the month was good summer weather.

The records of the several weather elements show the following features of interest: The mean barometer was practically normal and the range about the usual amount. The total wind movement was small and not a single gale was recorded. The wind direction was rather variable and an unusually large amount was from the South.

The mean temperature was slightly lower than the normal and the range was very small. This was due to a rather low maximum and a minimum more than five degrees higher than usual. Two periods of low temperature were noted; the first covering the time from the 4th to the 8th, and the second extending from the 16th to the 22d.

The mean dew point was practically normal and the relative humidity about 5 per cent higher than usual.

The total precipitation was nearly twice the normal for June and practically one-half of it fell during a rainy period about the middle of the month. On the 29th a very heavy thunder shower with some hail and shifting wind occurred and more than an inch of rain fell in about an hour.

The amount of sunshine was slightly less than the normal.

J. E. OSTRANDER, Meteorologist.

G. E. LINDSKOG, Acting Observer.

BULLETIN No. 379. JULY, 1920

# Meteorological Observations
AT THE
# MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.
*Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.*
*Height of Wind Instruments 72 ft. Time used, 75th Mer.*

## MONTHLY SUMMARY.

**Pressure.** In inches.

| | |
|---|---|
| Maximum reduced to freezing | 29.95, 11th, 8 A |
| Minimum reduced to freezing | 29.23, 24th, 4 A |
| Reduced maximum reading | 30.24, 11th, 8 A |
| Reduced minimum reading | 29.52, 24th, 4 A |
| Mean semi-daily reduced | 29.961 |
| Monthly range | 0.72 |

***Air Temperature.** In Degrees Fahr.

| | |
|---|---|
| Highest | 87.5, 13th, 3:30 P |
| Lowest | 45.0, 26th, 5 A |
| Mean hourly | 68.3 |
| Mean of means of max. and min. | 68.7 |
| Mean sensible (wet bulb) | 63.7 |
| Monthly range | 42.5 |
| Highest mean daily | 74.4. 13th |
| Lowest mean daily | 59.7, 26th |
| Mean maximum | 80.0 |
| Mean minimum | 57.5 |
| Mean daily range | 22.5 |
| Greatest daily range | 36.5, 27th |
| Least daily range | 9.0, 3d |

**Humidity.**

| | |
|---|---|
| Mean dew point | 60.9 |
| Mean force of vapor | .686 |
| Mean relative humidity | 77.6 |

**Precipitation.** In inches.

| | |
|---|---|
| Total precipitation, in inches | 2.06 |
| Number of days on which .01 inch or more rain fell | 10 |

**Wind.**

| | |
|---|---|
| Total movement | 3817 m |
| Greatest daily movement | 239m, 4th |
| Least daily movement | 33m, 27th |
| Mean daily movement | 123m |
| Mean hourly velocity | 5.1m |

Maximum pressure per square foot, 7.5 lbs= 39m per hour, 4th, 4 P, W.N.W.

Maximum velocity for 5 minutes, 27m per hour, 4th, 2P, W.N.W.

Prevailing direction, Southwest.

Summary.

| | |
|---|---|
| South Southwest | 23 per cent |
| South | 32 " " |
| Other directions | 45 " " |

**Weather.**

| | |
|---|---|
| Mean cloudiness observed | 50 per cent |
| Total cloudiness recorded by the Sun Thermometer | 140 hours = 30 per cent. |
| Number of clear days | 15 |
| Number of fair days | 13 |
| Number of cloudy days | 3 |

**Bright Sunshine.**

Number hours recorded, 322 hrs, 70 = per cent.

**Rain.** 2d, 3d, 7th. 9th, 12th, 15th, 18th, 19th, 23d, 24th, 30th, 31st.

**Thunder and Lightning.** 9th. 15th, 20th, 22d, 23d, 24th, 30th, 31st.

**Gales.** 39m, 4th, W.N.W.

*Temperature in ground shelter.

**Reduced to freezing and sea-level.

# DAILY SUMMARY.

| Day. | Barometer Reduced to Sea Level. | | | Temperature. Ground Shelter. | | | | | | | No. Hours of Bright Sunshine |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Maximum | Minimum. | Mean. Semi-daily | Maximum | Time. | Minimum. | Time. | Mean of Max. and Min. | Mean Hourly Draper. | Mean Sensible Wet Bulb. | |
| 1 | 29 91 | 29.75 | 29 844 | 80.0 | 4 P | 58.0 | 5 A | 69 0 | 69.1 | 63.5 | 13.7 |
| 2 | 29.92 | 29.78 | 29 855 | 79 5 | 3:30 P | 54.5 | 5 A | 67.0 | 68.0 | 62.5 | 10.3 |
| 3 | 29.79 | 29.60 | 29.635 | 66.0 | 5:30 P | 57.0 | 12 P | 61.5 | 62.7 | 61 5 | 3.2 |
| 4 | 29.77 | 29 60 | 29.680 | 71.0 | 12 M | 56.0 | 3 A | 63 5 | 61 5 | 57.0 | 10.0 |
| 5 | 29 98 | 29.76 | 29.856 | 74.0 | 3 P | 56.0 | 12 P | 65.0 | 64.5 | 59.7 | 11.5 |
| 6 | 30.05 | 29.98 | 30.016 | 81.5 | 4 P | 50.0 | 5:30 A | 65.7 | 66.8 | 62.0 | 13.0 |
| 7 | 30 02 | 29 83 | 29.910 | 81.5 | 2:30 P | 62.0 | 5 A | 71 7 | 70.2 | 66.0 | 7.0 |
| 8 | 29.98 | 29 85 | 29.918 | 80.0 | 11 A | 60 0 | 12 P | 70.0 | 72.1 | 66.5 | 12.0 |
| 9 | 30 10 | 29.97 | 30.068 | 82.0 | 2 P | 53 5 | 5:30 A | 67.7 | 67.4 | 63.3 | 9.5 |
| 10 | 30.18 | 30.06 | 30.138 | 83.5 | 4 P | 59.0 | 6 A | 71 3 | 69.8 | 64.5 | 11.8 |
| 11 | 30 24 | 30.15 | 30.200 | 86.5 | 3 P | 57.0 | 5:30 A | 71.7 | 70 8 | 66 0 | 12.0 |
| 12 | 30.15 | 30 05 | 30.098 | 81.5 | 3:30 P | 66 0 | 12 P | 73.7 | 70.5 | 67.0 | 4 3 |
| 13 | 30.17 | 30.10 | 30.136 | 87.5 | 3:30 P | 63.0 | 5:30 A | 75.3 | 74.4 | 68.5 | 13 0 |
| 14 | 30.11 | 29 88 | 29.978 | 85.0 | 2:30 P | 66 0 | 5 A | 75.5 | 73.8 | 70.3 | 8.8 |
| 15 | 29.88 | 29.85 | 29.878 | 80.5 | 4:30 P | 62.0 | 12 P | 71.3 | 71.9 | 67.7 | 3.7 |
| 16 | 30.03 | 29.90 | 29 993 | 75.0 | 3:30 P | 54.0 | 12 P | 64.5 | 64 0 | 56.5 | 13.0 |
| 17 | 30.16 | 30 04 | 30 085 | 74 0 | 5 P | 51.5 | 6 A | 62.7 | 62.2 | 55.7 | 12.7 |
| 18 | 30.18 | 30.03 | 30 116 | 78 0 | 2:30 P | 45.5 | 6 A | 61.7 | 62.4 | 60.5 | 9 0 |
| 19 | 30.03 | 29.80 | 29.838 | 82.0 | 2 P | 62.5 | 5 A | 72 3 | 71.7 | 69 5 | 8.7 |
| 20 | 30.16 | 29.91 | 30 076 | 81.0 | 5 P | 61.0 | 5 A | 71.0 | 68.8 | 63 0 | 13.0 |
| 21 | 30.15 | 30.03 | 30.090 | 82 0 | 3 P | 53.5 | 5 A | 67.7 | 69.4 | 65.5 | 12.0 |
| 22 | 30.05 | 29.95 | 30.002 | 86.0 | 2:30 P | 64.0 | 6 A | 75.0 | 73.3 | 69.7 | 10.7 |
| 23 | 29 95 | 29.70 | 29.802 | 81.5 | 2:30 P | 66.0 | 5 A | 73.7 | 72.9 | 70.5 | 9.4 |
| 24 | 29.76 | 29.52 | 29.594 | 82 0 | 1:30 P | 66.0 | 12 P | 74.0 | 71 8 | 66.7 | 6.6 |
| 25 | 30.00 | 29.76 | 29.889 | 72.0 | 1:30 P | 53.0 | 12 P | 62.5 | 64.3 | 57.7 | 13.4 |
| 26 | 30.02 | 29.99 | 30.009 | 72.0 | 5 P | 45.0 | 5 A | 58.5 | 59.7 | 56.7 | 13.7 |
| 27 | 30.10 | 30.02 | 30.058 | 82.0 | 5:30 P | 45 5 | 5:30 A | 63.7 | 62 9 | 57.7 | 13.0 |
| 28 | 30.19 | 30.10 | 30.155 | 85.5 | 4:30 P | 50.5 | 6 A | 68.0 | 68.1 | 63.3 | 13.0 |
| 29 | 30.17 | 30.05 | 30.114 | 83 0 | 2:30 P | 58.5 | 5:30 A | 70.7 | 71.0 | 65.3 | 12.0 |
| 30 | 30.08 | 29.88 | 29.946 | 79 0 | 4 P | 62.0 | 5 A | 70-5 | 69.5 | 66.0 | 9.0 |
| 31 | 29.95 | 29.75 | 29.819 | 84.0 | 3:30 P | 64.0 | 12 P | 74.0 | 71.3 | 65.7 | 8.6 |

# DAILY SUMMARY.

| Day. | Humidity. | | | Wind. | | | | | Precipitation. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Total in Inches. | |
| | Mean Dew Point. | Mean Force vapor. | Mean Relative Humidity | Prevailing Direction. | Total Movement in Miles. | Maximum Pressure Per Square Ft | Miles per Hour. | Time. | Beginning. | Ending. | Rain.** | Snow. |
| 1 | 61.0 | .679 | 81.0 | N. | 90 | 0.5 | 10 | 1 P | | | | |
| 2 | 58.5 | .700 | 67.0 | S. | 108 | 2.0 | 20 | 3 P | 5 P | 7 P | T | |
| 3 | 60.5 | .577 | 89.5 | N.N.E. | 113 | 0.5 | 10 | 2 P | 6 A | 3 P | .36 | |
| 4 | 53.0 | .560 | 72.5 | W. | 239 | 7.5 | 39 | 4 P | | | | |
| 5 | 57.0 | .596 | 79.0 | W.N.W. | 183 | 1.5 | 17 | 11 A | | | | |
| 6 | 56.5 | .685 | 64.5 | S.S.W. | 63 | 1.0 | 14 | 4 P | | | | |
| 7 | 63.5 | .721 | 80.0 | S. | 215 | 3.5 | 26 | 3 P | 2 P | 3 P | T | |
| 8 | 64.0 | .748 | 80.0 | W.N.W. | 215 | 1.0 | 14 | 3 P | | | | |
| 9 | 60.5 | .644 | 79.5 | S. | 111 | 2.5 | 22 | 2 P | 1 P | 8 P | .01 | |
| 10 | 62.0 | .682 | 76.0 | S.W. | 67 | 0.0 | — | — | | | | |
| 11 | 62.5 | .746 | 73.0 | S. | 36 | 1.5 | 17 | 10 P | | | | |
| 12 | 66.0 | .700 | 89.0 | S. | 112 | 0.5 | 10 | 3 P | 2 P | 4 P | .24 | |
| 13 | 64.5 | .858 | 67.5 | S.S.W. | 110 | 3.0 | 24 | 11 A | | | | |
| 14 | 68.5 | .818 | 83.0 | S. | 219 | 0.5 | 10 | 1 P | | | | |
| 15 | 65.0 | .784 | 78.0 | W.S.W. | 77 | 0.0 | — | — | 9 A | 3 P | .03 | |
| 16 | 51.0 | .563 | 66.0 | W. | 87 | 0.0 | — | — | | | | |
| 17 | 49.5 | .563 | 64.5 | N.W. | 52 | 0.5 | 10 | 4 P | | | | |
| 18 | 57.0 | .587 | 77.0 | S. | 79 | 1.5 | 17 | 11 A | 3:30P | 8 P | .09 | |
| 19 | 69.0 | .782 | 90.5 | S.S.W. | 168 | 2.5 | 22 | 2 P | 1 A | 9 A | .34 | |
| 20 | 59.5 | .682 | 77.0 | N.N.W. | 104 | 1.5 | 17 | 1 P | | | | |
| 21 | 62.0 | .748 | 70.5 | S.S.W. | 86 | 1.0 | 14 | 1 P | | | | |
| 22 | 68.0 | .818 | 82.0 | S. | 105 | 0.0 | — | — | | | | |
| 23 | 69.5 | .809 | 88.5 | S.S.W. | 160 | 1.5 | 17 | 1 P | 2 A | 12 P | .34 | |
| 24 | 64.5 | .750 | 81.5 | N.W. | 183 | 1.5 | 17 | 12 M | 0 A | 3 A | .20 | |
| 25 | 53.5 | .589 | 71.0 | N. | 137 | 1.0 | 14 | 12 M | | | | |
| 26 | 54.0 | .537 | 77.5 | N.N.W. | 79 | 0.5 | 10 | 4 P | | | | |
| 27 | 54.5 | .553 | 76.5 | S.W. | 33 | 0.0 | — | — | | | | |
| 28 | 60.5 | .694 | 76.0 | S.S.W. | 35 | 0.5 | 10 | 5 A | | | | |
| 29 | 62.5 | .745 | 75.5 | S. | 174 | 2.5 | 22 | 4 P | | | | |
| 30 | 64.0 | .730 | 82.0 | S. | 232 | 2.0 | 20 | 11 A | 12 M | 1 P | .02 | |
| 31 | 65.5 | .619 | 90.0 | S.S.W. | 145 | 2.0 | 20 | 2 P | 3 A | 12 P | .43 | |

**Rain or melted snow at base of tower. * Included in following day.

## REMARKS

The most noticeable feature of the weather during the month was the general absence of high temperatures. The maximum temperature was well below 90 degrees, and on more than one-third of the days the maximum did not reach 80 degrees,—a very unusual record for July. There were several cool periods of about three days' duration, notably the 3d-5th, the 16th-18th and the 25th-27th. During this last period the minimum of the month was reached. Another feature was the rather small precipitation, although there was a large number of thunder storms.

The records of the several weather elements, when compared with their respective normals, show the following features of interest: The mean barometer was practically normal and the range about the usual value. The maximum and minimum pressures were both slightly higher than their normals. The total wind movement was a little more than usual, and only one gale was recorded. During more than one-half the time the wind was from the South or South Southwest,—a rather unusual record here.

The mean temperature was more than two degrees lower than usual, and the maximum temperature was more than six degrees below the normal record for this feature. The minimum temperature was practically normal.

The mean dew point was practically normal and the relative humidity several points higher than usual, owing to the generally low temperature record.

The total precipitation was less than one-half the normal and was well distributed throughout the month.

The amount of sunshine recorded was greatly in excess of the normal.

J. E. OSTRANDER, Meteorologist.

G. E. LINDSKOG, Acting Observer.

BULLETIN No. 380. AUGUST, 1920

# Meteorological Observations
AT THE
# MASSACHUSETTS
# AGRICULTURAL EXPERIMENT
# STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.
*Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.*
*Height of Wind Instruments 72 ft. Time used, 75th Mer.*

## MONTHLY SUMMARY.

### **Pressure.** In inches.

| | |
|---|---|
| Maximum reduced to freezing | 30.11, 19th, 8 A |
| Minimum reduced to freezing | 29.33, 31st, 1 P |
| Reduced maximum reading | 30.40, 19th, 8 A |
| Reduced minimum reading | 29.62, 31st, 1 P |
| Mean semi-daily reduced | 30.061 |
| Monthly range | 0 78 |

### ***Air Temperature.** In Degrees Fahr.

| | |
|---|---|
| Highest | 92.0, 8th, 2:30 P |
| Lowest | 46.5, 21st, 6 A |
| Mean hourly | 70.2 |
| Mean of means of max. and min. | 71.8 |
| Mean sensible (wet bulb) | 65.5 |
| Monthly range | 45.5 |
| Highest mean daily | 76.4. 9th |
| Lowest mean daily | 63.3, 20th |
| Mean maximum | 82.6 |
| Mean minimum | 61.0 |
| Mean daily range | 21.6 |
| Greatest daily range | 35.5, 21st |
| Least daily range | 11.0, 15th |

### **Humidity.**

| | |
|---|---|
| Mean dew point | 63.5 |
| Mean force of vapor | .707 |
| Mean relative humidity | 84.3 |

### **Precipitation.** In inches.

| | |
|---|---|
| Total precipitation, in inches | 3 62 |
| Number of days on which .01 inch or more rain fell | 15 |

### **Wind.**

| | |
|---|---|
| Total movement | 2802 m |
| Greatest daily movement | 243m, 23d |
| Least daily movement | 40m, 26th |
| Mean daily movement | 90m |
| Mean hourly velocity | 3.8m |

Maximum pressure per square foot, 6.0 lbs = 35m per hour, 31st, 1 P, W.

Maximum velocity for 5 minutes, 36m per hour, 31st, 1 P, W.

Prevailing direction, South Southwest.

### Summary.

| | |
|---|---|
| South Southwest | 39 per cent |
| South | 23 " " |
| North Northeast | 13 " " |
| North | 10 " " |
| Other directions | 15 " " |

### **Weather.**

| | |
|---|---|
| Mean cloudiness observed | 55 per cent |
| Total cloudiness recorded by the Sun Thermometer | 167 hours = 39 per cent. |
| Number of clear days | 4 |
| Number of fair days | 22 |
| Number of cloudy days | 5 |

### **Bright Sunshine.**

Number hours recorded, 262 hrs, 61 = per cent.

**Rain,** 1st, 2d, 7th. 10th, 11th, 13th, 14th, 15th, 16th, 18th, 19th, 21st, 29th, 30th, 31st.

**Thunder and Lightning,** 10th, 11th, 13th, 30th, 31st.

**Gales,** 35m, 31st, W.

---

*Temperature in ground shelter.

**Reduced to freezing and sea-level.

# DAILY SUMMARY.

| Day. | Barometer Reduced to Sea Level. |  |  | Temperature. Ground Shelter. |  |  |  |  |  |  | No. Hours of Bright Sunshine |
|---|---|---|---|---|---|---|---|---|---|---|---|
|  | Maximum | Minimum. | Mean. Semi-daily | Maximum | Time. | Minimum. | Time. | Mean of Max. and Min. | Mean Hourly Draper. | Mean Sensible Wet Bulb. |  |
| 1 | 29.90 | 29.78 | 29.844 | 77.0 | 2 P | 62.0 | 7:30 A | 69.5 | 66.7 | 60.7 | 7.9 |
| 2 | 30.04 | 29.90 | 29.948 | 77.0 | 2:30 P | 58.0 | 6 A | 67.5 | 66.6 | 60.3 | 10.3 |
| 3 | 30.22 | 30.04 | 30.174 | 80.5 | 4 P | 52.5 | 6 A | 66.5 | 65.4 | 59.3 | 13.2 |
| 4 | 30.28 | 30.18 | 30.234 | 80.0 | 3 P | 52.0 | 6 A | 66.0 | 66.5 | 62.5 | 11.8 |
| 5 | 30.22 | 30.16 | 30.195 | 85.5 | 3 P | 55.0 | 6 A | 70.3 | 69.5 | 65.7 | 11.2 |
| 6 | 30.21 | 30.08 | 30.148 | 83.0 | 4:30 P | 60.0 | 6 A | 71.5 | 69.9 | 66.3 | 10.5 |
| 7 | 30.12 | 29.98 | 30.024 | 80.5 | 4:30 P | 65.0 | 6 A | 72.7 | 71.5 | 69.5 | 6.6 |
| 8 | 30.07 | 30.02 | 30.068 | 92.0 | 2:30 P | 64.0 | 6 A | 78.0 | 75.5 | 68.7 | 10.0 |
| 9 | 30.13 | 30.02 | 30.078 | 89.5 | 1:30 P | 64.5 | 5 A | 77.0 | 76.4 | 70.7 | 10.3 |
| 10 | 30.04 | 29.89 | 29.944 | 85.5 | 4 P | 70.0 | 5 A | 77.7 | 74.7 | 72.5 | 6.1 |
| 11 | 29.99 | 29.87 | 29.906 | 85.5 | 5:30 P | 67.0 | 12 P | 76.3 | 73.5 | 70.5 | 6.0 |
| 12 | 29.99 | 29.92 | 29.937 | 86.0 | 3 P | 65.0 | 5 A | 75.5 | 73.4 | 71.3 | 8.2 |
| 13 | 30.02 | 29.93 | 29.972 | 82.5 | 4 P | 71.0 | 5 A | 76.7 | 74.0 | 72.3 | 5.3 |
| 14 | 30.03 | 29.98 | 30.003 | 82.5 | 1 P | 71.0 | 7 A | 76.7 | 74.0 | 71.5 | 4.0 |
| 15 | 30.08 | 29.98 | 30.026 | 78.5 | 11:30 A | 67.5 | 12 M | 73.0 | 72.9 | 71.3 | 2.1 |
| 16 | 30.04 | 29.98 | 30.000 | 82.5 | 12:30 P | 69.0 | 12 P | 75.7 | 72.9 | 70.5 | 4.0 |
| 17 | 30.13 | 30.02 | 30.070 | 90.0 | 3:30 P | 69.5 | 6 A | 79.7 | 75.8 | 71.7 | 8.2 |
| 18 | 30.32 | 30.13 | 30.257 | 76.5 | 3 P | 64.0 | 12 P | 70.3 | 69.5 | 64.7 | 2.4 |
| 19 | 30.40 | 30.31 | 30.374 | 78.5 | 2:30 P | 61.0 | 2 A | 69.7 | 67.0 | 61.3 | 7.9 |
| 20 | 30.36 | 30.20 | 30.280 | 77.5 | 2 P | 51.0 | 6 A | 64.3 | 63.3 | 57.5 | 10.9 |
| 21 | 30.22 | 29.97 | 30.068 | 82.0 | 3:30 P | 46.5 | 6 A | 64.3 | 64.7 | 59.7 | 11.4 |
| 22 | 29.97 | 29.86 | 29.882 | 87.5 | 3:30 P | 65.0 | 12 P | 76.3 | 75.6 | 72.0 | 10.0 |
| 23 | 30.08 | 29.98 | 30.046 | 77.0 | 5:30 P | 59.0 | 12 P | 68.0 | 66.4 | 58.5 | 10.7 |
| 24 | 30.12 | 30.05 | 30.090 | 82.5 | 4 P | 54.0 | 6 A | 68.3 | 66.2 | 59.5 | 12.3 |
| 25 | 30.16 | 30.08 | 30.156 | 81.0 | 2:30 P | 53.0 | 6 A | 67.0 | 66.7 | 62.0 | 9.2 |
| 26 | 30.28 | 30.16 | 30.268 | 84.5 | 3:30 P | 55.0 | 6 A | 69.7 | 68.6 | 63.0 | 10.4 |
| 27 | 30.27 | 30.15 | 30.220 | 85.5 | 3:30 P | 56.5 | 6:30 A | 71.0 | 69.6 | 61.3 | 10.2 |
| 28 | 30.16 | 30.06 | 30.104 | 85.0 | 3:30 P | 56.5 | 6 A | 70.7 | 69.1 | 61.5 | 9.1 |
| 29 | 30.08 | 29.97 | 30.016 | 80.5 | 1:30 P | 62.5 | 6 A | 71.5 | 68.9 | 64.0 | 6.8 |
| 30 | 29.98 | 29.74 | 29.898 | 83.5 | 5:30 P | 64.0 | 6 A | 73.7 | 71.7 | 68.5 | 6.6 |
| 31 | 29.79 | 29.62 | 29.699 | 82.5 | 12 M | 61.5 | 6:30 A | 72.0 | 68.5 | 62.5 | 8.8 |

# DAILY SUMMARY.

| Day. | Humidity. | | | Wind. | | | | | Precipitation. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Mean Dew Point. | Mean Force vapor. | Mean Relative Humidity | Prevailing Direction. | Total Movement in Miles. | Maximum Pressure Per Square Ft | Miles per Hour. | Time. | Beginning. | Ending. | Total in Inches. | |
| | | | | | | | | | | | Rain.** | Snow. |
| 1 | 58.0 | .612 | 79.5 | W.S.W. | 58 | 0.5 | 10 | 2 A | 0 A | 2 A | .04 | |
| 2 | 57.0 | .635 | 79.5 | N.N.E. | 66 | 0.0 | — | — | 0 A | 5 A | .01 | |
| 3 | 55.0 | .583 | 77.0 | N. | 86 | 0.0 | — | — | | | | |
| 4 | 60.5 | .650 | 80.5 | E. | 69 | 0.0 | — | — | | | | |
| 5 | 64.0 | .614 | 83.0 | S.W. | 64 | 0.0 | — | — | | | | |
| 6 | 64.5 | .702 | 89.0 | S. | 62 | 0.0 | — | — | | | | |
| 7 | 68.5 | .783 | 93.0 | S.S.W. | 69 | 0.0 | — | — | 2 A | 12 M | .02 | |
| 8 | 66.5 | .800 | 83.0 | S. | 96 | 0.5 | 10 | 3 P | | | | |
| 9 | 69.5 | .834 | 88.0 | S. | 125 | 2.0 | 20 | 3 P | | | | |
| 10 | 71.0 | .855 | 88.5 | S.S.W. | 198 | 1.5 | 17 | 12 M | 2 A | 12 P | .65 | |
| 11 | 70.5 | .763 | 96.5 | S.S.W. | 93 | 1.5 | 17 | 11 P | 0 A | 11:30 P | .98 | |
| 12 | 70.5 | .810 | 92.5 | S. | 45 | 0.0 | — | — | | | | |
| 13 | 72.0 | .825 | 94.5 | S. | 64 | 0.5 | 10 | 9 P | 0 A | 12 P | .21 | |
| 14 | 70.5 | .816 | 92.0 | S. | 142 | 1.0 | 14 | 7 P | 0 A | 5 P | .55 | |
| 15 | 70.5 | .806 | 93.0 | S.S.W. | 88 | 0.5 | 10 | 1 P | 0 A | 12 M | .04 | |
| 16 | 70.0 | .772 | 94.0 | S.S.W. | 65 | 0.0 | — | — | 1 P | 12 P | .65 | |
| 17 | 70.5 | .836 | 92.0 | N. | 62 | 0.0 | — | — | | | | |
| 18 | 63.0 | .682 | 85.0 | E.N.E. | 80 | 0.5 | 10 | 8 A | 0 A | 4 A | .28 | |
| 19 | 59.5 | .584 | 88.5 | N.N.E. | 63 | 0.0 | — | — | 2 A | 4 A | .02 | |
| 20 | 55.0 | .526 | 84.0 | S.S.W. | 75 | 0.0 | — | — | | | | |
| 21 | 57.5 | .595 | 82.0 | S. | 75 | 1.0 | 14 | 6 P | 8 P | 12 P | .03 | |
| 22 | 70.0 | .889 | 83.5 | S.S.W. | 139 | 1.5 | 17 | 11 P | | | | |
| 23 | 55.0 | .587 | 74.0 | N.N.E. | 243 | 2.0 | 20 | 10 A | | | | |
| 24 | 56.0 | .614 | 67.5 | N. | 91 | 0.0 | — | — | | | | |
| 25 | 59.0 | .638 | 81.0 | N.N.E. | 51 | 0.0 | — | — | | | | |
| 26 | 61.0 | .663 | 80.5 | W. | 40 | 0.0 | — | — | | | | |
| 27 | 58.5 | .646 | 77.0 | S.S.W. | 41 | 0.0 | — | — | | | | |
| 28 | 58.5 | .640 | 78.0 | S.S.W. | 90 | 0.5 | 10 | 6 P | | | | |
| 29 | 62.0 | .661 | 85.0 | S.S.W. | 76 | 0.0 | — | — | 0 A | 6 P | .01 | |
| 30 | 67.5 | .760 | 88.0 | S.S.W. | 140 | 0.5 | 10 | 3 P | 9:30 P | 10 P | .01 | |
| 31 | 57.5 | .742 | 65.0 | S.S.W. | 146 | 6.0 | 35 | 1 P | 12:30 P | 2 P | .12 | |

**Rain or melted snow at base of tower. * Included in following day.

## REMARKS

The weather during the month was marked by high humidity, numerous small showers and a rather high temperature. While the wind movement was small it came from near the South point of the compass for an unusually large part of the time. The days seemed to be less cloudy than the nights.

A comparison of the records of the several weather elements with their respective normals shows the following interesting features: The mean barometer was considerably higher than the normal and the range slightly more than usual. Changes in barometric pressure were as a rule rather slow and unimportant. The total wind movement was about ten per cent less than normal, and only one gale was recorded.

The mean temperature was about two degrees higher than the normal and the mean of the maximum and minimum temperatures considerably higher than the mean hourly. This was due to the fact that the period of high temperature during the day was usually rather short. The maximum and minimum temperatures were both higher than their respective normals.

The highest temperature of the year so far was recorded on the 8th. The range of temperature for the month was smaller than usual.

The mean dew point was more than three degrees higher than usual and the relative humidity was more than seven points above the normal.

The total precipitation was about one-half inch less than the normal. The only heavy rainstorm was that of the 10th—11th.

The amount of sunshine was large and only a few days were classed as cloudy.

J. E. OSTRANDER, Meteorologist.

G. E. LINDSKOG, Acting Observer.

BULLETIN No. 381. SEPTEMBER, 1920

# Meteorological Observations
AT THE
# MASSACHUSETTS
# AGRICULTURAL EXPERIMENT
# STATION.

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OCT 7 - 1920
Agric  ral
Co  ge

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.
*Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.*
*Height of Wind Instruments 72 ft. Time used, 75th Mer.*

## MONTHLY SUMMARY.

**Pressure.** In inches.

Maximum reduced to freezing, 30.07, 22d, 9 A
Minimum reduced to freezing, 29.05, 30th, 12 P
Reduced maximum reading . 30.37, 22d, 9 A
Reduced minimum reading, 29.35, 30th, 12 P
Mean semi-daily reduced . . . . . . . . 29.990
Monthly range . . . . . . . . . . . . . . . 1.02

***Air Temperature.** In Degrees Fahr.

Highest . . . . . . . . . 90.0, 26th, 4:30 P
Lowest . . . . . . . 37.0, 20th, 6 A
Mean hourly . . . . . . . . . . . . . . . 62.8
Mean of means of max. and min. . . . . 64.1
Mean sensible (wet bulb) . . . . . . . . 57.4
Monthly range . . . . . . . . . . . . . . 53.0
Highest mean daily . . . . . . . . 70.2, 26th
Lowest mean daily . . . . . . . . 51.5, 20th
Mean maximum . . . . . . . . . . . . . . 75.7
Mean minimum . . . . . . . . . . . . . . 52.4
Mean daily range . . . . . . . . . . . . . 23.3
Greatest daily range . . . . . . . . . 36.0, 4th
Least daily range . . . . . . . . . . 6.0, 10th

**Humidity.**

Mean dew point . . . . . . . . . . . . . 55.5
Mean force of vapor . . . . . . . . . . . . .541
Mean relative humidity . . . . . . . . . . 83.9

**Precipitation.** In inches.

Total precipitation, in inches . . . . . 6.74
Number of days on which .01 inch or more rain fell . . . . . . . . . . . . . . . . 12

**Wind.**

Total movement . . . . . . . . . . . . . 3411 m
Greatest daily movement . . . . . 292m, 17th
Least daily movement . . . . . . 16m 25th
Mean daily movement . . . . . . . . . 114m
Mean hourly velocity . . . . . . . . . . 4.8m
Maximum pressure per square foot, 6.0 lbs= 35m per hour, 30th, 7P, S.
Maximum velocity for 5 minutes, 36m per hour, 30th, 7P, S.
Prevailing direction, West Southwest.

Summary.

South Southwest . . . . . . . . . 10 per cent
South . . . . . . . . . . . . . . . . . 13 " "
North Northeast . . . . . . . . . . . 13 " "
North . . . . . . . . . . . . . . . . . 10 " "
South Southeast . . . . . . . . . . 17 " "
Other directions . . . . . . . . . . 37 " "

**Weather.**

Mean cloudiness observed . . . . 52 per cent
Total cloudiness recorded by the Sun Thermometer . . 130 hours = 35 per cent.
Number of clear days . . . . . . . . . . . 8
Number of fair days . . . . . . . . . . . . 17
Number of cloudy days . . . . . . . . . . 5

**Bright Sunshine.**

Number hours recorded, 243 hrs, 65 = per cent.

**Rain.** 1st, 2d, 6th, 7th, 10th, 12th, 13th, 16th, 18th, 27th, 28th, 30th.

**Thunder and Lightning.** 12th, 13th, 30th.

**Gales.** 35m, 30th, S.

*Temperature in ground shelter.
**Reduced to freezing and sea-level.

# DAILY SUMMARY.

| Day. | Barometer Reduced to Sea Level. | | | Temperature. Ground Shelter. | | | | | | | No. Hours of Bright Sunshine |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Maximum | Minimum. | Mean. Semi-daily | Maximum | Time. | Minimum. | Time. | Mean of Max. and Min. | Mean Hourly Draper. | Mean Sensible Wet Bulb. | |
| 1 | 29 94 | 29.68 | 29.787 | 72.0 | 3 P | 52.0 | 12 P | 62.0 | 62.7 | 57.5 | 10.5 |
| 2 | 30.12 | 29 94 | 30.049 | 71.5 | 3 P | 45.0 | 6:30 A | 58.3 | 57.8 | 53.7 | 12.0 |
| 3 | 30.15 | 30.08 | 30.123 | 77.5 | 4 P | 43.0 | 6 A | 60.3 | 59.2 | 51.5 | 11.8 |
| 4 | 30.18 | 30.09 | 30.130 | 79 5 | 4:30 P | 43.5 | 6:30 A | 61.5 | 60.5 | 52.7 | 10.4 |
| 5 | 30.17 | 30.13 | 30.156 | 79.5 | 4:30 P | 44 5 | 6 A | 62.0 | 62.2 | 56 3 | 11.5 |
| 6 | 30.17 | 29.94 | 30.043 | 76.0 | 3 P | 51.5 | 6 A | 63.7 | 64 3 | 61.0 | 7.5 |
| 7 | 29 94 | 29.86 | 29.913 | 79 5 | 3 P | 61.0 | 12 P | 70.3 | 67.2 | 62.0 | 6.2 |
| 8 | 30.03 | 29.88 | 29.935 | 77.0 | 3 P | 57 5 | 6 A | 67.3 | 66.5 | 60.3 | 10.9 |
| 9 | 30.09 | 29.96 | 30.021 | 80.0 | 3 P | 48 5 | 6 A | 64 3 | 65.0 | 58 0 | 10.8 |
| 10 | 29.96 | 29.78 | 29 812 | 65.0 | 0 A | 59.0 | 12 P | 62.0 | 61.2 | 58.3 | 0.0 |
| 11 | 29.92 | 29 85 | 29.886 | 77 5 | 3:30 P | 57.5 | 6 A | 67.5 | 64.9 | 59.7 | 8 3 |
| 12 | 29.89 | 29.59 | 29.642 | 82 0 | 4 P | 62.0 | 6 A | 72 0 | 68.5 | 64.5 | 6.1 |
| 13 | 29.80 | 29.60 | 29.672 | 75.0 | 1 P | 60.0 | 12 P | 67.5 | 64.8 | 57.7 | 6.0 |
| 14 | 30.03 | 29.80 | 29.902 | 70 5 | 2:30 P | 53 0 | 6 A | 61.7 | 61.5 | 57.0 | 9.4 |
| 15 | 30.12 | 30 03 | 30.077 | 68.0 | 4 P | 58 0 | 0 A | 63.0 | 62.5 | 59.3 | 5 7 |
| 16 | 30.04 | 29.77 | 29 848 | 68.5 | 5:30 P | 60.0 | 12 P | 64.3 | 63.8 | 59.5 | 2.0 |
| 17 | 29.97 | 29.82 | 29.902 | 67.0 | 3 P | 48.0 | 6 A | 57.5 | 58.3 | 49.3 | 11.5 |
| 18 | 30 01 | 29 69 | 29 812 | 76.0 | 2:30 P | 49.5 | 6 A | 62 7 | 63.5 | 56.5 | 8.1 |
| 19 | 30.14 | 29 89 | 30.084 | 62.0 | 3 P | 42.0 | 6:30 A | 52.0 | 51.7 | 46 0 | 11.5 |
| 20 | 30.24 | 30.13 | 30.218 | 64.0 | 2:30 P | 37 0 | 6 A | 50.5 | 51.5 | 48.3 | 8.5 |
| 21 | 30.35 | 30.24 | 30.325 | 71.0 | 3:30 P | 46.0 | 6 A | 58-5 | 56.2 | 50.5 | 8.5 |
| 22 | 30 37 | 30 28 | 30.324 | 73.5 | 3:30 P | 49.0 | 4:30 A | 61.3 | 59.2 | 54.0 | 8.6 |
| 23 | 30.30 | 30.18 | 30.245 | 81.0 | 3:30 P | 48 0 | 6:30 A | 64 5 | 63 2 | 60.3 | 8.5 |
| 24 | 30.17 | 30.02 | 30.121 | 86.5 | 3 P | 56.0 | 6 A | 71.3 | 66.4 | 62.3 | 8.3 |
| 25 | 30.15 | 30.04 | 30.110 | 89.0 | 3 P | 58.0 | 6 A | 73.5 | 68 6 | 62.0 | 9.0 |
| 26 | 30.14 | 30.05 | 30.105 | 90.0 | 4:30 P | 56.0 | 7 A | 73.0 | 70.2 | 63.0 | 10.8 |
| 27 | 30.15 | 30.00 | 30 097 | 85 5 | 1:30 P | 55.5 | 7 A | 70.5 | 67.3 | 60.5 | 7.8 |
| 28 | 30.00 | 29.85 | 29.897 | 75.0 | 12 M | 63.0 | 6 A | 69.0 | 67.4 | 67.0 | 3.7 |
| 29 | 29.76 | 29.86 | 29.903 | 80.0 | 4 P | 51.0 | 7 A | 65.5 | 63.8 | 58 0 | 9.1 |
| 30 | 29.88 | 29.35 | 29.571 | 73.0 | 7 P | 58.5 | 5 A | 65.7 | 64.7 | 65.3 | 0.0 |

# DAILY SUMMARY.

| Day. | Humidity. | | | Wind. | | | | | Precipitation. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Total in Inches. | |
| | Mean Dew Point. | Mean Force vapor. | Mean Relative Humidity | Prevailing Direction. | Total Movement in Miles. | Maximum Pressure Per Square Ft | Miles per Hour. | Time. | Beginning. | Ending. | Rain.** | Snow. |
| 1 | 54.5 | .574 | 76.5 | N.N.W. | 170 | 2.5 | 22 | 10 A | 4 A | 5 A | .02 | |
| 2 | 47.5 | .458 | 71.5 | N. | 149 | 3.0 | 24 | 11 A | 8:30 P | 9 P | .02 | |
| 3 | 47.5 | .458 | 71.0 | N.N.E. | 64 | 0.0 | — | — | | | | |
| 4 | 50.0 | .464 | 80.5 | S.W. | 18 | 0.0 | — | — | | | | |
| 5 | 53.0 | .524 | 78.5 | S.S.W. | 37 | 0.0 | — | — | | | | |
| 6 | 59.0 | .606 | 83.5 | N.E. | 90 | 0.0 | — | — | 9:30 P | 12 P | .03 | |
| 7 | 59.5 | .644 | 80.0 | N. | 104 | 0.5 | 10 | 6 P | 0 A | 5 P | .09 | |
| 8 | 57.5 | .619 | 77.0 | N.N.W. | 141 | 1.5 | 17 | 9 A | | | | |
| 9 | 56.0 | .548 | 82.5 | S. | 58 | 0.0 | — | — | | | | |
| 10 | 57.0 | .510 | 91.5 | N.E. | 99 | 0.0 | — | — | 0 A | 4 P | 1.18 | |
| 11 | 57.5 | .580 | 82.0 | S.S.E. | 66 | 0.5 | 10 | 9 P | | | | |
| 12 | 63.0 | .654 | 89.0 | S. | 137 | 2.0 | 20 | 5 A | 0 A | 12 P | .54 | |
| 13 | 55.0 | .541 | 81.5 | N. | 160 | 2.5 | 22 | 3 P | 0 A | 9 A | .04 | |
| 14 | 53.5 | .548 | 75.0 | N.N.E. | 280 | 3.0 | 24 | 12 M | | | | |
| 15 | 56.5 | .569 | 80.5 | N.N.E. | 108 | 0.0 | — | — | | | | |
| 16 | 58.0 | .558 | 86.5 | S.S.E. | 145 | 2.0 | 20 | 4 P | 4 A | 9 P | .15 | |
| 17 | 44.0 | .432 | 67.0 | N.W. | 292 | 3.5 | 26 | 12 M | | | | |
| 18 | 52.0 | .589 | 78.5 | S.W. | 190 | 1.5 | 17 | 5 P | 10 P | 11 P | .07 | |
| 19 | 42.5 | .345 | 77.0 | W.S.W. | 229 | 1.5 | 17 | 2 P | | | | |
| 20 | 46.0 | .373 | 85.5 | W. | 64 | 0.0 | — | — | | | | |
| 21 | 48.5 | .406 | 84.5 | W. | 68 | 0.0 | — | — | | | | |
| 22 | 52.0 | .451 | 86.0 | S. | 97 | 0.5 | 10 | 2 P | | | | |
| 23 | 60.0 | .557 | 96.0 | S.S.E. | 55 | 0.0 | — | — | | | | |
| 24 | 62.0 | .586 | 96.0 | S.S.E. | 27 | 0.0 | — | — | | | | |
| 25 | 61.0 | .601 | 89.0 | S.S.W. | 16 | 0.0 | — | — | | | | |
| 26 | 62.0 | .611 | 92.5 | N.W. | 35 | 0.0 | — | — | | | | |
| 27 | 60.0 | .557 | 95.0 | S.S.E. | 67 | 1.0 | 14 | 6 P | 11 P | 12 P | .04 | |
| 28 | 66.5 | .684 | 95.0 | S. | 196 | 2.5 | 22 | 9 A | 3 P | 11 P | 1.16 | |
| 29 | 57.0 | .513 | 92.5 | S.S.W. | 83 | 0.0 | — | — | | | | |
| 30 | 65.0 | .658 | 96.5 | S. | 166 | 6.0 | 35 | 7 P | 1 A | 12 P | 3.40 | |

**Rain or melted snow at base of tower.

* Included in following day.

## REMARKS

The weather during September was in general seasonable, although presenting several marked characteristics. One of the most prominent features was the absence of frost up to the end of the month. On the 20th light frost was noted in some places in the vicinity, but no damage was done. At the station not even a trace was observed. Following the 20th there was much foggy weather and a very high humidity. The highest temperatures of the month were registered near the end of the month. On the 30th one of the heaviest rainstorms ever noted at this station occurred, accompanied by a rapid fall of the barometer. The month closed with high wind and rain.

The mean barometer was rather low and the range considerably more than usual. The maximum and minimum pressures were both below their respective normals. The total wind movement was practically normal and more variability than usual was noted on the wind direction chart. The only gale recorded was during the storm of the 30th.

The mean temperature was one and one-half degrees higher than the normal, and both the maximum and minimum temperatures were several degrees higher than usual. The mean of maximum and minimum temperatures was considerably higher than the mean hourly temperature, due to the fact that the period of high temperature each day was only a few hours at the most.

The mean dew point and relative humidity were both considerably higher than the normal.

The total precipitation was nearly twice the normal amount and about one-half of it fell on the last day of the month. The amount of sunshine was large.

J. E. OSTRANDER, Meteorologist.

H. W. POOLE, Observer.

**BULLETIN No. 382.** **OCTOBER, 1920**

# Meteorological Observations
AT THE
# MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.
*Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.*
*Height of Wind Instruments 72 ft. Time used, 75th Mer.*

## MONTHLY SUMMARY.

**Pressure.** In inches.

| | |
|---|---|
| Maximum reduced to freezing, | 30.10, 18th, 9 A |
| Minimum reduced to freezing, | 28.97, 1st, 3 A |
| Reduced maximum reading | 30.39, 18th, 9 A |
| Reduced minimum reading, | 29.26, 1st, 3 A |
| Mean semi-daily reduced | 30.071 |
| Monthly range | 1.13 |

***Air Temperature.** In Degrees Fahr.

| | |
|---|---|
| Highest | 81.5, 9th, 3:30 P |
| Lowest | 29.5, 7th, 6 A |
| Mean hourly | 55.4 |
| Mean of means of max. and min. | 56.4 |
| Mean sensible (wet bulb) | 51.3 |
| Monthly range | 52.0 |
| Highest mean daily | 66.8, 22d |
| Lowest mean daily | 41.8, 30th |
| Mean maximum | 68.4 |
| Mean minimum | 44.4 |
| Mean daily range | 24.0 |
| Greatest daily range | 44.0, 7th |
| Least daily range | 9.5, 5th |

**Humidity.**

| | |
|---|---|
| Mean dew point | 49.3 |
| Mean force of vapor | .417 |
| Mean relative humidity | 86.7 |

**Precipitation.** In inches.

| | |
|---|---|
| Total precipitation, in inches | 1.54 |
| Number of days on which .01 inch or more rain fell | 6 |

**Wind.**

| | |
|---|---|
| Total movement | 3188 m |
| Greatest daily movement | 349m, 1st |
| Least daily movement | 0 m 6th |
| Mean daily movement | 103m |
| Mean hourly velocity | 4.3 m |

Maximum pressure per square foot, 12.0 lbs = 49m per hour, 1st, 3A, S.S.W.

Maximum velocity for 5 minutes, 40m per hour, 1st, 2A, S.S.W.

Prevailing direction, West Southwest.

Summary.

| | | |
|---|---|---|
| South Southwest | 23 | per cent |
| Southwest | 13 | " " |
| North Northwest | 10 | " " |
| Northwest | 10 | " " |
| West Southwest | 10 | " " |
| West | 10 | " " |
| Other directions | 24 | " " |

**Weather.**

Mean cloudiness observed . . . . 48 per cent

Total cloudiness recorded by the Sun Thermometer . . 148 hours = 43 per cent.

| | |
|---|---|
| Number of clear days | 9 |
| Number of fair days | 10 |
| Number of cloudy days | 12 |

**Bright Sunshine.**

Number hours recorded, 196 hrs, = 57 per cent.

**Rain,** 1st, 5th. 16th, 26th, 27th, 28th, 29th.

**Thunder and Lightning,** 29th.

**Frost,** 7th, 24th.

**Gales,** 49m, 1st, S.S.W.

*Temperature in ground shelter.

**Reduced to freezing and sea-level.

# DAILY SUMMARY.

| Day. | Barometer Reduced to Sea Level. | | | Temperature. Ground Shelter. | | | | | | | No. Hours of Bright Sunshine |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Maximum | Minimum. | Mean. Semi-daily | Maximum | Time. | Minimum. | Time. | Mean of Max. and Min. | Mean Hourly Draper. | Mean Sensible Wet Bulb. | |
| 1 | 29 84 | 29.26 | 29.610 | 73.0 | 1 A | 48 0 | 12 P | 60.5 | 59.5 | 55.5 | 5.0 |
| 2 | 30.16 | 29 84 | 30.067 | 62.0 | 3 P | 41.5 | 7 A | 51.7 | 51.4 | 49.0 | 10.0 |
| 3 | 30 23 | 30.11 | 30.174 | 71.5 | 2 P | 40.0 | 6 A | 55.7 | 55.4 | 52 3 | 10.0 |
| 4 | 30.11 | 29.92 | 30.004 | 75.5 | 3 P | 49 0 | 3 A | 62.3 | 60.7 | 56.3 | 9.0 |
| 5 | 30.10 | 29 93 | 30.010 | 56.0 | 3 P | 46.5 | 7 A | 51.3 | 50.9 | 49.0 | 3.2 |
| 6 | 30.22 | 30.10 | 30.195 | 62.5 | 3 P | 41.0 | 6 A | 51 7 | 50.2 | 46.5 | 9.0 |
| 7 | 30.21 | 30.07 | 30.144 | 73.5 | 3:30 P | 29.5 | 6 A | 51.5 | 49 8 | 43.5 | 10.0 |
| 8 | 30.14 | 30.04 | 30.093 | 80.0 | 3:30 P | 39.0 | 7 A | 59.5 | 55.8 | 51.0 | 10.0 |
| 9 | 30.15 | 30.02 | 30.092 | 81.5 | 3:30 P | 41.0 | 7 A | 61.3 | 56 8 | 51.3 | 10.2 |
| 10 | 30.06 | 29.92 | 29.992 | 75.0 | 1:30 P | 42.0 | 7 A | 58-5 | 58.0 | 50.7 | 10.0 |
| 11 | 30.17 | 30.06 | 30.142 | 71.0 | 3 P | 38.5 | 7 A | 54.7 | 54.6 | 50.5 | 9.9 |
| 12 | 30.19 | 30.13 | 30.154 | 55.0 | 4:30 P | 40.0 | 12 P | 47.5 | 49.1 | 46.7 | 0.0 |
| 13 | 30.24 | 30.04 | 30.148 | 72.0 | 3 P | 33 0 | 7 A | 52.5 | 47.9 | 44 0 | 8.8 |
| 14 | 30.04 | 29 95 | 29.988 | 74.0 | 2 P | 42.0 | 5 A | 58.0 | 57.2 | 51.3 | 6 3 |
| 15 | 30.18 | 30.04 | 30.148 | 65.5 | 3 P | 48.0 | 7 A | 56 7 | 56.3 | 53.3 | 4.9 |
| 16 | 30.15 | 30.07 | 30.134 | 67.0 | 4:30 P | 52.0 | 7 A | 59.5 | 56.7 | 57 0 | 3 5 |
| 17 | 30.31 | 30.16 | 30.250 | 74.0 | 4 P | 55.0 | 6 A | 64.5 | 60.5 | 56.5 | 6.5 |
| 18 | 30.39 | 30.29 | 30.350 | 63.5 | 2 P | 51.0 | 4 A | 57.3 | 58 3 | 56.3 | 1.0 |
| 19 | 30.29 | 30.13 | 30.180 | 70.0 | 2 P | 52 5 | 2 A | 61 3 | 59.1 | 56.0 | 5.0 |
| 20 | 30.28 | 30.16 | 30.240 | 74.0 | 3 P | 45.5 | 4 A | 59.7 | 57.8 | 53.0 | 8.5 |
| 21 | 30.21 | 29.99 | 30.096 | 80.5 | 2 P | 51 0 | 7 A | 65.7 | 66.3 | 60.3 | 8.5 |
| 22 | 30.09 | 29.85 | 29 903 | 77.0 | 2 P | 64.0 | 7 A | 70.5 | 66.8 | 56.0 | 9.4 |
| 23 | 30.25 | 30.08 | 30.220 | 62.5 | 3 P | 41.0 | 12 P | 51.7 | 50.8 | 43.7 | 9.3 |
| 24 | 30.26 | 30.08 | 30.188 | 69.0 | 3 P | 31.0 | 3 A | 50.0 | 49.7 | 44.3 | 7.3 |
| 25 | 30.08 | 29 93 | 30.008 | 72 0 | 2:30 P | 49.0 | 6 A | 60.5 | 57.9 | 53.7 | 5.7 |
| 26 | 30.12 | 30.03 | 30.092 | 63.0 | 4 P | 51.0 | 7 A | 57 0 | 55.4 | 51.3 | 3.5 |
| 27 | 30.03 | 29.73 | 29.887 | 72.5 | 1 P | 52.5 | 0 A | 62.5 | 65.7 | 64.5 | 1.5 |
| 28 | 29.83 | 29 72 | 29.770 | 67.5 | 2 A | 52.0 | 12 P | 59.7 | 59.8 | 56.3 | 0.0 |
| 29 | 30 00 | 29.70 | 29.825 | 55.0 | 12 M | 37.0 | 12 P | 46.0 | 46.3 | 43.0 | 2.3 |
| 30 | 30.10 | 30.00 | 30.076 | 46.0 | 3 P | 34.0 | 2:30 A | 40.0 | 41.8 | 40.0 | 3.5 |
| 31 | 30.06 | 29.98 | 30.021 | 59.0 | 3 P | 39.0 | 6 A | 49.0 | 51.3 | 47.3 | 4.3 |

# DAILY SUMMARY.

| Day. | Humidity. | | | Wind. | | | | | Precipitation. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Total in Inches. | |
| | Mean Dew Point. | Mean Force vapor. | Mean Relative Humidity | Prevailing Direction. | Total Movement in Miles. | Maximum Pressure Per Square Ft | Miles per Hour. | Time. | Beginning. | Ending. | Rain.** | Snow. |
| 1 | 53.0 | .499 | 85.5 | S.W. | 349 | 12.0 | 49 | 3 A | 0 A | 4 A | .55 | |
| 2 | 47.0 | .377 | 86.5 | S.W. | 205 | 2.5 | 22 | 2 P | | | | |
| 3 | 50.0 | .439 | 84.0 | S.S.W. | 116 | 1.0 | 14 | 1 P | | | | |
| 4 | 54.0 | .513 | 81.5 | S.S.W. | 58 | 0.0 | — | — | | | | |
| 5 | 47.5 | .377 | 87.0 | N. | 3 | 0.0 | — | — | 8 A | 11 A | .08 | |
| 6 | 45.5 | .330 | 92.5 | N.N.E. | 0 | 0.0 | — | — | | | | |
| 7 | 42.0 | .312 | 90.0 | S.W. | 8 | 0.0 | — | — | | | | |
| 8 | 50.0 | .401 | 90.5 | S.W. | 9 | 0.0 | — | — | | | | |
| 9 | 50.5 | .401 | 92.5 | S.S.W. | 14 | 0.0 | — | — | | | | |
| 10 | 48.5 | .413 | 83.5 | N.W. | 88 | 2.0 | 20 | 12 M | | | | |
| 11 | 49.5 | .386 | 90.5 | N.W. | 58 | 1.0 | 14 | 1 P | | | | |
| 12 | 46.0 | .327 | 94.5 | N.N.E. | 35 | 0.5 | 10 | 3 P | | | | |
| 13 | 43.0 | .308 | 93.5 | W. | 13 | 0.0 | — | — | | | | |
| 14 | 50.5 | .413 | 89.5 | N.N.W. | 18 | 0.0 | — | — | | | | |
| 15 | 52.5 | .417 | 95.5 | S.S.E. | 14 | 0.0 | — | — | | | | |
| 16 | 52.0 | .406 | 87.5 | S.S.W. | 36 | 0.0 | — | — | 0 A | 8 A | T | |
| 17 | 55.5 | .475 | 91.5 | W.S.W. | 29 | 0.0 | — | — | | | | |
| 18 | 56.0 | .489 | 93.0 | S.S.W. | 35 | 0.0 | — | — | | | | |
| 19 | 55.0 | .469 | 94.0 | S.S.W. | 87 | 0.0 | — | — | | | | |
| 20 | 52.0 | .422 | 93.5 | N.N.W. | 36 | 0.0 | — | — | | | | |
| 21 | 59.0 | .577 | 86.0 | W.S.W. | 121 | 0.5 | 10 | 2 P | | | | |
| 22 | 49.0 | .598 | 61.0 | W.N.W. | 283 | 4.0 | 28 | 12 M | | | | |
| 23 | 34.5 | .374 | 53.0 | W. | 170 | 0.5 | 10 | 10 A | | | | |
| 24 | 43.5 | .318 | 92.0 | S. | 156 | 1.0 | 14 | 1 P | | | | |
| 25 | 53.0 | .431 | 93.0 | S. | 137 | 0.5 | 10 | 10 A | | | | |
| 26 | 50.0 | .397 | 92.5 | N. | 64 | 5.0 | 32 | 11 P | 1 A | 5 A | .04 | |
| 27 | 63.0 | .657 | 87.5 | S.S.W. | 320 | 5.0 | 32 | 5 P | 4 P | 12 P | .20 | |
| 28 | 55.0 | .476 | 92.5 | N.W. | 197 | 0.0 | — | — | 0 A | 1 P | .55 | |
| 29 | 41.0 | .296 | 88.5 | N.N.W. | 126 | 2.0 | 20 | 7 P | 12 M | 3 P | .12 | |
| 30 | 37.0 | .273 | 81.0 | W. | 251 | 2.5 | 22 | 11 A | | | | |
| 31 | 43.0 | .369 | 75.5 | W.S.W. | 152 | 2.0 | 20 | 2 P | | | | |

**Rain or melted snow at base of tower. * Included in following day.

## REMARKS

The weather during the month was generally pleasant and very mild. Our records show that it was the warmest October since the station was established. No frost occurred until the 7th, and only one other frost, on the 24th, was recorded. Neither of these could hardly be called a killing frost. The precipitation was rather small and after the tail end of the storm that ushered in the month there was practically no more rain until the last week of the month. The last week was generally cloudy.

The records of the several weather elements show the following features of more or less interest: The mean barometer was practically normal and the range of pressure about the usual amount. The minimum pressure was very low for this time of year and occurred at 3 A. M. on the 1st, at the end of the heavy rainstorm which was in progress when the preceding month closed. The maximum barometer was also rather low and came near the middle of the month. The total wind movement was about three-fourths of the normal, and many of the daily records were very small. The wind was rather variable in direction.

The mean hourly temperature was more than five degrees higher than usual, making it the warmest October on our records as referred to above. The maximum temperature was rather high and the temperature reached 80 degrees or more on three days. The minimum temperature was more than six degrees higher than the normal for this record. Owing to the high minimum the range was less than usual.

The total precipitation was about 40 per cent of the normal and was mostly in small storms. The mean dew point and relative humidity were both high.

The amount of sunshine was above the normal and about one-third of the number of days were clear, one-third fair and one-third cloudy.

J. E. OSTRANDER, Meteorologist.

H. W. POOLE, Observer.

BULLETIN No. 383. NOVEMBER, 1920

# Meteorological Observations
AT THE
# MASSACHUSETTS
# AGRICULTURAL EXPERIMENT
# STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.
*Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.*
*Height of Wind Instruments 72 ft. Time used, 75th Mer.*

## MONTHLY SUMMARY.

### **Pressure.** In inches.

| | |
|---|---|
| Maximum reduced to freezing, | 30.30, 29th, 9 A |
| Minimum reduced to freezing, | 29.04, 17th, 3 P |
| Reduced maximum reading . | 30.62, 29th, 9 A |
| Reduced minimum reading, | 29 35, 17th, 3 P |
| Mean semi-daily reduced . . . . . . . . | 30.129 |
| Monthly range . . . . . . . . . . . . . . . | 1.27 |

### *Air Temperature. In Degrees Fahr.

| | |
|---|---|
| Highest . . . . . . . . . | 62.0, 2d, 11 P |
| Lowest . . . . . . . | 16.0, 13th, 7 A |
| Mean hourly . . . . . . . . . . . . . . . . | 36.9 |
| Mean of means of max. and min. . . . . | 36.9 |
| Mean sensible (wet bulb) . . . . . . . . . | 32.1 |
| Monthly range . . . . . . . . . . . . . . | 46.0 |
| Highest mean daily . . . . . . . . . | 49 9. 1st |
| Lowest mean daily . . . . . . . . . | 26.9, 21st |
| Mean maximum . . . . . . . . . . . . . . . | 44.5 |
| Mean minimum . . . . . . . . . . . . . . . | 29.3 |
| Mean daily range . . . . . . . . . . . . . | 15.2 |
| Greatest daily range . . . . . . . . . | 31.5, 2d |
| Least daily range . . . . . . . | 5.0, 25th, 28th |

### Humidity.

| | |
|---|---|
| Mean dew point . . . . . . . . . . . . . | 26.9 |
| Mean force of vapor . . . . . . . . . . . . . | .211 |
| Mean relative humidity . . . . . . . . . | 73.9 |

### **Precipitation.** In inches.

| | |
|---|---|
| Total precipitation, in inches . . . . . . | 4.67 |
| Total snow, in inches . . . . . . . . . . . | $5\frac{1}{2}$ |
| Number of days on which .01 inch or more rain fell . . . . . . . . . . . . . . . . | 9 |

*Temperature in ground shelter.

**Reduced to freezing and sea-level

### Wind.

| | |
|---|---|
| Total movement . . . . . . . . . . . . . | 4268 m |
| Greatest daily movement . . . . . | 338m, 3d |
| Least daily movement . . . . . . | 27m 7th |
| Mean daily movement . . . . . . . . . | 142m |
| Mean hourly velocity . . . . . . . . . . | 5.9 m |

Maximum pressure per square foot, 6.5 lbs= 36m per hour, 17th, 9P, W.N.W.

Maximum velocity for 5 minutes, 33m per hour, 17th, 9P, W.N.W.

Prevailing direction, Northwest.

### Summary.

| | |
|---|---|
| North Northeast . . . . . . . . . . | 23 per cent |
| West Northwest . . . . . . . . . | 13 " " |
| South Southwest . . . . . . . . . | 13 " " |
| Northwest . . . . . . . . . . . . . . | 10 " " |
| West Southwest . . . . . . . . . . | 10 " " |
| Other directions . . . . . . . . . . | 31 " " |

### Weather.

Mean cloudiness observed . . . . 65 per cent

Total cloudiness recorded by the Sun Thermometer . . 207 hours = 70 per cent.

| | |
|---|---|
| Number of clear days . . . . . . . . . . . . | 2 |
| Number of fair days . . . . . . . . . . . . | 8 |
| Number of cloudy days . . . . . . . . . . . | 20 |

### Bright Sunshine.

Number hours recorded, 86 hrs, = 30 per cent.

**Rain,** 1st, 2d, 7th. 9th, 16th, 17th, 21st, 23d, 24th, 25th. 27th.

**Snow,** 12th, 16th, 21st, 24th, 25th. 27th.

**Hail,** 16th.

**Frost,** before the 16th : 4th, 9th, 11th, 12th 13th, 14th.

**Gales,** 36m. 17th, W.N.W.; 35m, 23d, N. E.

# DAILY SUMMARY.

| Day. | Barometer Reduced to Sea Level. | | | Temperature. Ground Shelter. | | | | | | | No. Hours of Bright Sunshine |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Maximum | Minimum. | Mean. Semi-daily | Maximum | Time. | Minimum. | Time. | Mean of Max. and Min. | Mean Hourly Draper. | Mean Sensible Wet Bulb. | |
| 1 | 30.23 | 29 92 | 30.062 | 57.0 | 11 A | 33 0 | 12 P | 45.0 | 49.9 | 42.7 | 2 3 |
| 2 | 30.23 | 29.53 | 29.951 | 62.0 | 11 P | 30.5 | 3 A | 46.3 | 40.1 | 37.7 | 0.0 |
| 3 | 29 86 | 29.53 | 29.778 | 54.0 | 2:30 P | 40.0 | 12 P | 47.0 | 49.2 | 40.2 | 6.3 |
| 4 | 30.00 | 29 86 | 29.929 | 57.0 | 3 P | 32.0 | 7:30 A | 44.5 | 45.9 | 37.3 | 8.3 |
| 5 | 30.29 | 29 87 | 30.114 | 57.0 | 1 P | 39.0 | 2 A | 48.0 | 48 6 | 40.5 | 5.5 |
| 6 | 30.49 | 30 29 | 30.432 | 54.0 | 2 P | 39 0 | 2 A | 46.5 | 44.6 | 37 0 | 7.2 |
| 7 | 30 50 | 30.22 | 30 384 | 45.0 | 2 P | 33 0 | 4 A | 39.0 | 39 2 | 34.3 | 3.1 |
| 8 | 30.22 | 30.09 | 30.156 | 52.0 | 3 P | 36.0 | 12 P | 44.0 | 42.0 | 37.5 | 3.4 |
| 9 | 30.16 | 29.74 | 29.952 | 56.5 | 9 P | 31.0 | 7 A | 43.7 | 45 0 | 43.5 | 0.0 |
| 10 | 30.28 | 29 73 | 30.102 | 57.5 | 3 A | 33.0 | 12 P | 45.3 | 44 8 | 36.3 | 5.8 |
| 11 | 30.34 | 30.10 | 30.236 | 46.0 | 4 P | 23.0 | 7 A | 34.5 | 32 6 | 22.7 | 7.6 |
| 12 | 30.17 | 29 97 | 30.066 | 38.5 | 11:30 A | 25.0 | 12 P | 31.7 | 29.7 | 24.0 | 1.5 |
| 13 | 30 39 | 30.17 | 30.352 | 40.0 | 3 P | 16.0 | 7 A | 28.0 | 28 5 | 24 0 | 8.1 |
| 14 | 30.41 | 30.32 | 30.389 | 44 5 | 3 P | 22.0 | 6 A | 33.3 | 32.4 | 26.5 | 7.8 |
| 15 | 30.42 | 30.35 | 30 396 | 35.5 | 4 P | 21 0 | 6 A | 28.3 | 29.4 | 24.7 | 0.0 |
| 16 | 30.45 | 30.13 | 30.362 | 35 5 | 2 P | 28 0 | 7 A | 31.7 | 32.4 | 30.0 | 0.0 |
| 17 | 30.13 | 29.35 | 29 542 | 39 0 | 4:30 P | 32.5 | 2 A | 35 7 | 36.5 | 35.7 | 0.0 |
| 18 | 30.18 | 29.75 | 30.152 | 46 0 | 1 P | 33.0 | 7 A | 39 5 | 39.7 | 32 5 | 3.8 |
| 19 | 30.15 | 30.03 | 30.072 | 43.0 | 3 P | 29.5 | 7 A | 36.3 | 38.3 | 32.3 | 1.7 |
| 20 | 30.20 | 30.00 | 30.102 | 44.0 | 1 P | 31.0 | 12 P | 37.5 | 38.3 | 32.5 | 0.0 |
| 21 | 30.29 | 30.15 | 30.235 | 31.0 | 0 A | 23 5 | 7:30 A | 27.3 | 26.9 | 25.0 | 0.0 |
| 22 | 30.17 | 29.99 | 29.087 | 37.0 | 12 P | 29.0 | 0 A | 33.0 | 32 5 | 31.0 | 0.0 |
| 23 | 29.99 | 29.46 | 29.526 | 42.0 | 8:30 A | 33.5 | 12 P | 37.7 | 37.8 | 37.5 | 0.0 |
| 24 | 29 92 | 29.59 | 29.826 | 40.0 | 3 P | 32 0 | 8 P | 36 0 | 34.6 | 31.7 | 0.5 |
| 25 | 30.02 | 29.91 | 29.927 | 35.0 | 4 P | 30.0 | 6 A | 32.5 | 32 9 | 31.7 | 0.0 |
| 26 | 30 24 | 30.02 | 30.120 | 37.0 | 4 P | 24.0 | 7:30 A | 30.5 | 31.5 | 26.5 | 4.0 |
| 27 | 30.28 | 30.24 | 30.267 | 35.0 | 3 P | 22.5 | 7:30 A | 30.3 | 31.6 | 29.7 | 0.0 |
| 28 | 30.50 | 30.26 | 30.381 | 35.0 | 12 M | 30.0 | 12 P | 32.5 | 32.9 | 30.3 | 0.0 |
| 29 | 30 62 | 30.49 | 30 577 | 40.0 | 3 P | 21.0 | 7:30 A | 30.5 | 29.9 | 21.3 | 8.6 |
| 30 | 30.49 | 30.34 | 30.422 | 40.0 | 3 P | 23.5 | 2 A | 31.7 | 30.3 | 26.0 | 0.0 |

# DAILY SUMMARY.

| Day. | Humidity. | | | Wind. | | | | | Precipitation. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Mean Dew Point. | Mean Force vapor. | Mean Relative Humidity | Prevailing Direction. | Total Movement in Miles. | Maximum Pressure Per Square Ft | Miles per Hour. | Time. | Beginning. | Ending. | Total in Inches. | |
| | | | | | | | | | | | Rain.** | Snow. |
| 1 | 38.0 | .324 | 73.0 | W.S.W. | 185 | 2.0 | 20 | 2 P | 12 M | 2 P | T | |
| 2 | 35.0 | .248 | 84.0 | N.N.W. | 42 | 5 5 | 33 | 12 P | 12 M | 12 P | .95 | |
| 3 | 35.5 | .292 | 72.0 | W.N W. | 328 | 5.0 | 32 | 0 A | | | | |
| 4 | 30.5 | .274 | 63 5 | S.S.W. | 95 | 1.5 | 17 | 8 P | | | | |
| 5 | 35.0 | .297 | 68.0 | W. | 260 | 3.0 | 24 | 1 P | | | | |
| 6 | 27.5 | .276 | 55.0 | N.W. | 151 | 1.5 | 17 | 2 P | | | | |
| 7 | 29.5 | .222 | 75.5 | N.W. | 27 | 0.0 | — | — | 7 P | 9 P | .03 | |
| 8 | 33.5 | .251 | 76.5 | S.S.W. | 73 | 0.5 | 10 | 4 P | | | | |
| 9 | 40.5 | .326 | 85.0 | S.S.W. | 173 | 2.5 | 22 | 4 P | 8 A | 10 P | T | |
| 10 | 30.0 | .258 | 67.0 | W.N.W. | 300 | 3 0 | 24 | 1 P | | | | |
| 11 | 11.5 | .182 | 52.0 | S. | 45 | 0 0 | — | — | | | | |
| 12 | 17.5 | .147 | 68.5 | W.N.W. | 236 | 5 0 | 32 | 2 P | 8 A | 9 A | | T |
| 13 | 16.0 | .149 | 62 5 | W.N.W. | 229 | 2.5 | 22 | 10 A | | | | |
| 14 | 19.0 | .166 | 63.0 | W.S.W. | 123 | 1.0 | 14 | 12 M | | | | |
| 15 | 16.5 | .155 | 63.0 | S.S.E. | 33 | 0.0 | — | — | | | | |
| 16 | 25.5 | .178 | 79.0 | N.N.E. | 63 | 0.0 | — | — | 1 P | 12 P | .75 | 2 |
| 17 | 33.0 | .221 | 85 0 | N.N.E. | 130 | 6.5 | 36 | 9 P | 0 A | 2 P | 1.02 | |
| 18 | 24.5 | .222 | 60.5 | N.W. | 306 | 4 0 | 28 | 0 A | | | | |
| 19 | 25 5 | .217 | 66.5 | W.S.W. | 149 | 1.0 | 14 | 3 P | | | | |
| 20 | 28.5 | .201 | 79.0 | N.N.E. | 101 | 1.0 | 14 | 8 P | | | | |
| 21 | 23.0 | .142 | 88 0 | N.N.E. | 145 | 0.5 | 10 | 6 A | 5 A | 12 P | .25 | ½ |
| 22 | 27.0 | .185 | 80.0 | N.N.E. | 52 | 0.0 | — | — | | | | |
| 23 | 36.0 | .235 | 91.5 | N.E. | 280 | 6.0 | 35 | 6 A | 1 A | 12 P | 2.27 | |
| 24 | 29.5 | .188 | 87.5 | N.N.E. | 200 | 1.5 | 17 | 1 A | 8 P | 12 P | .06 | T |
| 25 | 30 5 | .183 | 92.5 | N.N.E. | 84 | 0.5 | 10 | 7 P | 0 A | 10 A | .19 | 2 |
| 26 | 24.5 | .149 | 88.5 | N. | 119 | 0.5 | 10 | 6 P | | | | |
| 27 | 28 0 | .170 | 92.5 | S.S.W. | 57 | 0.0 | — | — | 5 P | 12 P | .10 | 1 |
| 28 | 27 0 | .182 | 82.0 | E.N E. | 107 | 0.5 | 10 | 5 P | | | | |
| 29 | 7.0 | .140 | 45.0 | N. | 139 | 0.0 | — | — | | | | |
| 30 | 21.0 | .158 | 72.5 | S. | 86 | 0.0 | — | — | | | | |

**Rain or melted snow at base of tower. * Included in following day.

## REMARKS

The weather records for November show that, contrary to the general opinion, the month was slightly colder than usual. The precipitation was large and more than the usual amount of snow was recorded. The most noticeable feature, however, was the large number of dark gloomy days and the great deficiency in sunshine. Another unusual feature was the persistency in wind from the northeast quadrant for about a week during the last part of the month. Two decided low barometric readings were noted on the 17th and 23d respectively.

The records of the several weather elements show the following interesting features: The mean barometer was unusually high and the range was practically normal. Only eight days showed a mean barometer lower than 30 inches. The total wind movement was slightly less than the normal, and only a few days showed a large wind movement. The direction of the wind was more varied than usual. The only gales recorded were during the two low barometer periods referred to above.

The mean hourly temperature was more than one and a half degrees below the normal, and the maximum was slightly lower than usual. The minimum temperature was not as low as usual and was registered before the middle of the month.

The mean dew point and relative humidity were both comparatively low.

The total precipitation was nearly fifty per cent above the normal, and nearly one-half the total fell on one day. The snow which fell was soon melted, so that the ground was bare when the month closed.

Two-thirds of the days were either cloudy or overcast, and the amount of sunshine was very small.

J. E. OSTRANDER, Meteorologist.

H. W. POOLE, Observer.

BULLETIN No. 384. DECEMBER, 1920

# Meteorological Observations
AT THE
# MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.
*Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.*
*Height of Wind Instruments 72 ft. Time used, 75th Mer.*

## MONTHLY SUMMARY.

**Pressure.** In inches.

| | |
|---|---|
| Maximum reduced to freezing, | 30.27, 26th, 9 A |
| Minimum reduced to freezing, | 29.04, 2d, 4 A |
| Reduced maximum reading | 30.60, 26th, 9 A |
| Reduced minimum reading, | 29.35, 2d, 4 A |
| Mean semi-daily reduced | 29.962 |
| Monthly range | 1.25 |

***Air Temperature.** In Degrees Fahr.

| | |
|---|---|
| Highest | 58.0, 14th, 6 P |
| Lowest | 4.0, 26th, 9 A |
| Mean hourly | 30.7 |
| Mean of means of max. and min. | 31.0 |
| Mean sensible (wet bulb) | 26.8 |
| Monthly range | 54.0 |
| Highest mean daily | 45.4. 14th |
| Lowest mean daily | 11.0, 26th |
| Mean maximum | 37.9 |
| Mean minimum | 24.1 |
| Mean daily range | 13.8 |
| Greatest daily range | 25.0, 14th |
| Least daily range | 5.0, 22d |

**Humidity.**

| | |
|---|---|
| Mean dew point | 21.5 |
| Mean force of vapor | .166 |
| Mean relative humidity | 73.7 |

**Precipitation.** In inches.

| | |
|---|---|
| Total precipitation, in inches | 6.02 |
| Total snow, in inches | 7 |
| Number of days on which .01 inch or more rain fell | 9 |

Days of Sleighing, 5

*Temperature in ground shelter.

**Reduced to freezing and sea-level.

**Wind.**

| | |
|---|---|
| Total movement | 5280 m |
| Greatest daily movement | 419m, 6th |
| Least daily movement | 22m 13th |
| Mean daily movement | 170m |
| Mean hourly velocity | 6.7 m |

Maximum pressure per square foot, 10.0 lbs = 45m per hour, 2d, 1P, W.N.W.

Maximum velocity for 5 minutes, 32m per hour, 2d, 2 P, W.N.W.

Prevailing direction, Northwest.

Summary.

| | |
|---|---|
| North Northeast | 13 per cent. |
| West Northwest | 19 " " |
| South Southwest | 10 " " |
| Northwest | 23 " " |
| North | 13 " " |
| Other directions | 22 " " |

**Weather.**

| | |
|---|---|
| Mean cloudiness observed | 57 per cent |
| Total cloudiness recorded by the Sun Thermometer | 140 hours = 49 per cent. |
| Number of clear days | 5 |
| Number of fair days | 14 |
| Number of cloudy days | 12 |

**Bright Sunshine.**

Number hours recorded, 143 hrs, = 51 per cent.

**Rain,** 1st, 3d, 4th. 5th, 10th, 13th, 14th, 22d, 23d, 27th.

**Snow,** 5th, 9th, 10th, 16th. 22d, 27th.

**Sleet,** 27th.

**Gales,** 45m. 2d, W.N.W.; 40m, 6th, N.W.

# DAILY SUMMARY.

| Day. | Barometer Reduced to Sea Level. | | | Temperature. Ground Shelter. | | | | | | | No. Hours of Bright Sunshine |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Maximum | Minimum. | Mean. Semi-daily | Maximum | Time. | Minimum. | Time. | Mean of Max. and Min. | Mean Hourly Draper. | Mean Sensible Wet Bulb. | |
| 1 | 30.33 | 29.41 | 29.875 | 36.0 | 12 P | 28.5 | 0 A | 32.3 | 31.9 | 30.0 | 0.0 |
| 2 | 30.11 | 29.35 | 29.693 | 45.0 | 1 P | 32.0 | 12 P | 38.5 | 38.0 | 31.5 | 2.5 |
| 3 | 30.29 | 30.08 | 30.210 | 36.0 | 2 P | 26.0 | 7 P | 31.0 | 31.9 | 28.0 | 6.3 |
| 4 | 30.09 | 29.95 | 30.051 | 46.0 | 3 P | 33.0 | 6 A | 39.5 | 37.2 | 33.5 | 7.0 |
| 5 | 29.95 | 29.37 | 29.493 | 49.0 | 4 P | 34.5 | 3 A | 41.7 | 40.4 | 37.0 | 1.5 |
| 6 | 29.87 | 29.54 | 29.701 | 42.0 | 0 A | 30.5 | 12 P | 36.3 | 36.4 | 31.5 | 1.5 |
| 7 | 30.10 | 29.87 | 29.976 | 39.0 | 2 P | 27.0 | 12 P | 33.0 | 31.9 | 27.5 | 7.4 |
| 8 | 30.37 | 30.10 | 30.319 | 39.0 | 3 P | 20.0 | 7 A | 29.5 | 27.7 | 22.3 | 8.4 |
| 9 | 30.36 | 30.07 | 30.280 | 35.0 | 5 P | 21.0 | 3 A | 28.0 | 28.8 | 27.0 | 2.0 |
| 10 | 30.07 | 29.60 | 29.783 | 37.0 | 4 P | 30.5 | 9 A | 33.7 | 33.0 | 30.5 | 1.6 |
| 11 | 29.91 | 29.58 | 29.756 | 37.0 | 3 P | 28.0 | 12 P | 32.5 | 32.9 | 30.3 | 6.0 |
| 12 | 30.20 | 29.91 | 30.108 | 46.0 | 3 P | 23.0 | 7 A | 34.5 | 31.0 | 23.7 | 8.2 |
| 13 | 30.30 | 30.20 | 30.261 | 35.0 | 4 P | 23.0 | 5 A | 29.0 | 29.7 | 28.5 | 0.0 |
| 14 | 30.19 | 29.40 | 29.641 | 58.0 | 6 P | 33.0 | 0 A | 45.5 | 45.4 | 43.5 | 0.0 |
| 15 | 29.59 | 29.45 | 29.515 | 46.0 | 0 A | 33.0 | 12 P | 39.5 | 39.2 | 32.5 | 4.7 |
| 16 | 29.58 | 29.50 | 29.532 | 38.0 | 3 P | 29.0 | 7 A | 33.5 | 32.8 | 28.3 | 5.7 |
| 17 | 29.50 | 29.46 | 29.497 | 35.0 | 4 P | 27.0 | 8 A | 31.0 | 31.0 | 26.5 | 6.5 |
| 18 | 29.94 | 29.53 | 29.732 | 35.0 | 3 P | 26.0 | 2 A | 30.5 | 30.3 | 27.0 | 6.5 |
| 19 | 30.13 | 29.44 | 30.094 | 35.0 | 2 P | 24.0 | 7 A | 29.5 | 29.4 | 23.7 | 6.0 |
| 20 | 30.36 | 30.13 | 30.288 | 37.0 | 3 P | 16.0 | 7 A | 26.5 | 25.6 | 20.0 | 8.0 |
| 21 | 30.48 | 30.36 | 30.444 | 36.0 | 3 P | 16.5 | 7 P | 26.3 | 26.3 | 22.0 | 8.0 |
| 22 | 30.47 | 29.92 | 30.273 | 31.0 | 12 P | 26.0 | 2 A | 28.5 | 28.7 | 27.7 | 0.3 |
| 23 | 29.92 | 29.59 | 29.684 | 45.5 | 5 P | 31.0 | 0 A | 38.3 | 37.5 | 35.0 | 3.0 |
| 24 | 30.04 | 29.78 | 29.929 | 39.0 | 0 A | 27.0 | 12 P | 33.0 | 33.2 | 30.0 | 6.1 |
| 25 | 30.45 | 30.04 | 30.288 | 29.0 | 2 P | 11.0 | 12 P | 20.0 | 22.1 | 16.3 | 8.3 |
| 26 | 30.60 | 30.39 | 30.536 | 16.5 | 2 P | 4.0 | 9 A | 10.3 | 11.0 | 6.7 | 5.0 |
| 27 | 30.39 | 29.73 | 29.962 | 23.5 | 5 P | 13.0 | 3 A | 18.3 | 18.1 | 17.3 | 0.0 |
| 28 | 29.94 | 29.74 | 29.888 | 33.5 | 5 P | 18.0 | 12 P | 25.7 | 28.2 | 23.5 | 6.0 |
| 29 | 30.04 | 29.92 | 29.990 | 33.5 | 3:30 P | 10.0 | 9 A | 21.7 | 21.2 | 15.3 | 7.2 |
| 30 | 30.03 | 29.90 | 29.981 | 40.0 | 2:30 P | 25.5 | 2 A | 32.7 | 31.9 | 29.0 | 7.5 |
| 31 | 30.20 | 29.87 | 30.052 | 40.0 | 1 P | 19.0 | 12 P | 29.5 | 30.2 | 25.3 | 2.0 |

# DAILY SUMMARY.

| | Humidity. | | | Wind. | | | | | Precipitation. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Total in Inches. | |
| Day. | Mean Dew Point. | Mean Force vapor. | Mean Relative Humidity | Prevailing Direction. | Total Movement in Miles. | Maximum Pressure Per Square Ft | Miles per Hour. | Time. | Beginning. | Ending. | Rain.** | Snow. |
| 1 | 28.0 | .176 | 89.5 | N. | 90 | 0.0 | — | — | 1 A | 10 P | .93 | |
| 2 | 24 0 | .210 | 63 5 | N.W. | 393 | 10.0 | 45 | 1 P | | | | |
| 3 | 23.5 | .167 | 78.0 | W.S.W. | 110 | 0.0 | — | — | 8 P | 11 P | .10 | |
| 4 | 29.5 | .213 | 73.5 | S.W. | 63 | 0.0 | — | — | 0 A | 12 M | 1.71 | |
| 5 | 33 5 | .242 | 80.0 | N.W. | 165 | 4.0 | 28 | 3 P | 9 A | 10 A | T | T |
| 6 | 24.5 | .204 | 64.0 | N.W. | 419 | 8.0 | 40 | 3 P | | | | |
| 7 | 21.5 | .170 | 68.5 | N.N.W. | 260 | 3.5 | 26 | 6 P | | | | |
| 8 | 15.5 | .133 | 67.0 | N.N.E. | 207 | 2.5 | 22 | 2 A | | | | |
| 9 | 22.0 | .162 | 73.5 | N.N.E. | 307 | 3.0 | 24 | 7 P | 7 P | 10 P | T | T |
| 10 | 27.5 | .180 | 84.5 | N.N.E. | 188 | 1.0 | 14 | 11 A | 9 A | 12 P | .13 | 1 |
| 11 | 27.0 | .180 | 82.0 | N.W. | 225 | 3 0 | 24 | 8 A | | | | |
| 12 | 16.0 | .148 | 62.0 | W.N W. | 42 | 0 0 | — | — | | | | |
| 13 | 24.0 | .170 | 78.0 | W.N.W. | 22 | 0.0 | — | — | 8 P | 12 P | .10 | |
| 14 | 42.5 | .297 | 92.5 | S.S.W. | 229 | 5.5 | 33 | 3 P | 0 A | 12 P | 1.56 | |
| 15 | 29.0 | .205 | 77.5 | S.W. | 212 | 3.5 | 26 | 7 P | | | | |
| 16 | 23.5 | .170 | 76.5 | S.S.W. | 172 | 0.5 | 10 | 2 P | 8 P | 11 P | T | T |
| 17 | 22 5 | .157 | 78 0 | W. | 76 | 0.0 | — | — | | | | |
| 18 | 22.5 | .162 | 78.0 | W.N.W. | 169 | 2.0 | 20 | 3 P | | | | |
| 19 | 16.0 | .146 | 63 0 | W.S.W. | 128 | 0.0 | — | — | | | | |
| 20 | 13.5 | .125 | 68.0 | N W. | 75 | 0.0 | — | — | | | | |
| 21 | 16.0 | .131 | 70.0 | N.W. | 93 | 0 5 | 10 | 2 P | | | | |
| 22 | 26.0 | .158 | 92.0 | N. | 44 | 0.0 | — | — | 5 P | 12 P | .20 | T |
| 23 | 32.0 | .224 | 83 0 | N.W. | 149 | 2.5 | 22 | 10 P | 0 A | 11 A | .24 | |
| 24 | 28.0 | .175 | 89 0 | W.N.W | 356 | 4 0 | 28 | 10 A | | | | |
| 25 | 9.5 | .103 | 67 0 | N.N.W. | 295 | 4.0 | 28 | 11 A | | | | |
| 26 | −7.0 | .070 | 46.5 | N.N.E. | 107 | 1.0 | 14 | 10 A | | | | |
| 27 | 12.5 | .106 | 75.5 | N. | 157 | 0.5 | 10 | 3 P | 1 A | 6 P | 1.05 | 6 |
| 28 | 14.0 | .145 | 64.5 | W.N.W. | 209 | 3.0 | 24 | 6 A | | | | |
| 29 | 3.0 | .107 | 51.0 | S.S.W | 93 | 1 0 | 14 | 6 P | | | | |
| 30 | 24 5 | .176 | 75.0 | W.N.W. | 111 | 0.5 | 10 | 10 P | | | | |
| 31 | 21.5 | .135 | 79.5 | N. | 114 | 2.0 | 20 | 4 P | | | | |

**Rain or melted snow at base of tower.  * Included in following day.

# Annual Summary for 1920.

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### **Pressure.** In inches.

| | |
|---|---|
| Maximum reduced to freezing, | 30.71, Feb. 1st, 10 A. |
| Minimum reduced to freezing, | 28.72, Mar. 13th, 5 P. |
| Maximum reduced to freezing and sea-level, | 31.05, Feb. 1st, 10 A. |
| Minimum reduced to freezing and sea-level, | 29.03, Mar. 13th, 5 P. |
| Mean semi-daily reduced to freezing and sea-level, | 30.004 |
| Annual range, | 2.02 |

### ***Air Temperature.** In degrees Fahr.

| | |
|---|---|
| Highest, | 92, Aug. 8th, 2:30 P. |
| Lowest, | —18.0, Feb. 1st, 7 A. |
| Mean hourly, | 46.4 |
| Mean of means of max. and min., | 46.8 |
| Mean sensible (wet bulb), | 42.2 |
| Annual range, | 110.0 |
| Highest mean daily, | 76.4, Aug. 9 |
| Lowest mean daily, | —4.7, Jan. 3 |
| Mean maximum, | 57.1 |
| Mean minimum, | 36.6 |
| Mean daily range, | 20.5 |
| Greatest daily range, | 44.0, Oct. 7 |
| Least daily range, | 3.5, Feb. 26, Apr. 2d |

### **Humidity.**

| | |
|---|---|
| Mean dew point, | 38.7 |
| Mean force of vapor, | .372 |
| Mean relative humidity, | 79.2 |

### **Wind.**

| | |
|---|---|
| Total movement, | 51,470 m |
| Greatest daily movement, | 537 m., Mar. 6 |
| Least daily movement, | 0 m., Oct. 6 |
| Mean daily movement, | 141 m |
| Mean hourly velocity, | 5.9 m |
| Maximum pressure per square foot, | 16.0 lbs., 57 m. per hour, Mar. 6, 10:30 A., N.W. |
| Maximum velocity for 5 minutes, | 40 m. per hour, Oct. 1, 2 A. S.S.W. |
| Prevailing direction, | West. |

Summary.

| | |
|---|---|
| South Southwest | 16 per cent |
| South | 10 " " |
| West Northwest | 11 " " |
| North | 9 " " |
| North Northeast | 9 " " |
| Other directions, | 35 " " |

### **Precipitation.** In inches.

| | |
|---|---|
| Total precipitation, rain or melted snow, | 50.09 |
| Snow total in inches, | 78.00 |
| Number of days on which .01 or more rain or melted snow fell, | 135 |

### **Weather.**

| | |
|---|---|
| Mean cloudiness observed, | 51 per cent. |
| Total cloudiness recorded by Sun Thermometer, | 1795 hrs.=40 per cent. |
| Number of clear days, | 118 |
| Number of fair days, | 156 |
| Number of cloudy days, | 92 |

### **Bright Sunshine.**

Number of hours recorded, 2662 hrs.=60 per cent.

### **Dates of Frosts.**

| | |
|---|---|
| Last, | April 26th |
| First, | Oct. 7th |

### **Dates of Snow.**

| | |
|---|---|
| Last, | April 8th |
| First, | Nov. 12th |
| Total days of sleighing, | 79 |

### **Gales of 50 or More Miles Per Hour.**

Mar. 6th, 57m., N.W.

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*Temperature in ground shelter.

J. E. OSTRANDER,
*Meteorologist.*

H. W. POOLE,
*Observer.*